Creative Crowdwork Arrangements

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English Abstract

Crowdwork is a sociotechnical phenomenon that has the capacity to transform the way in which work is organized and contributes to an organization's value. Crowdwork contributes to innovation, augments strategic competitive advantage, and reduces costs of labor by providing organizations with flexible access to a substantial pool of skillful workers who can be hired on a temporary basis. Nowadays, crowdwork is being used increasingly and provides quite a few opportunities and challenges for organizations. My thesis focuses on creative crowdwork, which is complex work requiring professional expertise and, thus, requires considerably more complex governance and work structure than routine crowdwork. The extant research has focused mainly on crowdwork arrangements in which digital platforms play a major role as intermediaries that manage the relationships between crowdworkers and job providers. However, crowdwork is possible with other forms of governance and work organization that have different degrees of centralization and control in terms of platforms, workers, and job providers. Little is known as to how these other arrangements deliver value to job providers. Accordingly, my thesis contributes to a better understanding of creative crowdwork arrangements by exploring *how creative crowdwork is governed and organized to add value for job providers.* To address this overarching research question, I adopted the qualitative research paradigm and conducted four research studies. In Study 1, I explored the governance of current crowdwork arrangements through a state-of-the-art review of theories and developments in the field. In Study 2, I used a comparative case study to investigate how creative crowdwork arrangements are governed under centralized and decentralized modes. In Study 3, I used a longitudinal embedded case study to explore the organizational value of crowdwork for large organizations, specifically focusing on absorptive capacity and its achievement via crowdworking routinization. Finally, in Study 4, I used a longitudinal case study to explore how the structures of work are organized in creative crowdwork arrangements. My thesis contributes to a better understanding of the crowdwork phenomenon by identifying and describing three different crowdwork arrangements that add value to job providers: the platform-centric arrangement, actor-centric arrangement, and organization-centric arrangement. Eliciting these arrangements advances the theoretical and practical knowledge on governance frameworks of work organization of creative crowdwork and how they add value for job providers and, in particular, large organizations. Overall, my thesis helps to forge the future of creative crowdwork by shedding light on the design and routinization of successful arrangements that nurture the absorptive capacity and innovation potential of organizations.

Keywords: *Crowdwork, Absorptive Capacity, Routinization, Open Innovation, Future of Work*

Dansk Abstrakt

Crowdwork er et socio-teknisk fænomen, der har kapaciteten til at ændre måden hvordan arbejde organiseres på. Crowdwork kan bidrage til at styrke innovation, strategiske konkurrencemæssig fordele og reducere arbejdsomkostninger ved at give organisationer fleksibel adgang til en stor pulje af ressourcestærke arbejdere, der kan ansættes midlertidigt. Denne fleksibilitet kan herved styrke en organisations evne til at opfange værdi og øge produktivitet. Der er en stigende anvendelse af crowdwork nu om dage som giver en hel del muligheder og udfordringer for organisationer. Min afhandling fokuserer på kreativt crowdwork, hvilket involverer professionelle og komplekse opgaver og derfor kræver en betydelig mere kompleks ledelses- og arbejdsstruktur end rutinemæssigt crowdwork. Den eksisterende forskning har fokuseret primært på crowdwork-arrangementer, hvor digitale platforme fungerer som formidlere og spiller en vigtig rolle i forholdet mellem crowdwork-arbejdere og jobudbydere. Der er dog andre potentielle former for ledelse og typer af arbejdsorganistioner, baseret på forskellige grader af centralisering og kontrol fra platforme, arbejdere og jobudbydere. Der er til dags dato meget lidt viden omkring, hvordan forskellige crowdwork-arrangementer giver værdi til jobudbydere. I henhold til dette bidrager min afhandling til en bedre forståelse af kreative crowdwork-arrangementer ved at undersøge, hvordan kreativt crowdwork styres og organiseres for at tilføre værdi til jobudbydere. For at adressere dette overordnede forskningsspørgsmål anvendte jeg det kvalitative forskningsparadigme og gennemførte fire forskningsstudier. I det første studie udforskede jeg nuværende ledelsesstrukturer af crowdwork-arrangementer gennem en redegørelse of videreudvikling af seneste teorier. I det andet studie undersøgte jeg, hvordan kreative crowdwork-arrangementer styres under centraliserede og decentraliserede tilstande gennem et komparativ casestudie. I det tredje studie udforskede jeg den organisatoriske værdi af crowdwork i store organisationer med specifik fokus på absorberende kapacitet og hvordan dette er opnået via crowdwork-rutiner gennem et længerevarende integreret casestudie. I det fjerde studie undersøgte jeg på afsluttende vis, hvordan strukturerne for en arbejdsorganisation indenfor kreative crowdwork-arrangementer dannes og formes gennem en længerevarende casestudie. Min afhandling bidrager til en bedre forståelse af crowdwork-fænomenet igennem identificering og beskrivelse af tre forskellige crowdwork-arrangementer, der tilføjer værdi til jobudbydere: platform-centreret arrangementer, aktør-centreret arrangementer og organisations-centreret arrangementer. Disse arrangementer fremmer den teoretiske og praktiske forståelse af ledelsesstrukturer for kreativt crowdwork arbejdsorganisationer, der tilføjer værdi for jobudbydere og især for store organisationer. Samlet set hjælper min afhandling med at skabe en fremtid for crowdwork ved at kaste lys over design og rutiner fra vellykkede kreative crowdwork-arrangementer, der gør brug af organisationers absorberende kapacitet og innovationspotentiale.

Keywords: *Crowdwork, Absorberende Kapacitet, Routiner, Åben Innovation, Fremtidens Arbejde*

Table of Contents

Table of Tables

Table of Figures

I. Introduction

I begin with an introduction to crowdwork, the primary phenomenon under investigation in my Ph.D. thesis, and justify the topic's significance for researchers and practitioners. I present the purposes of my research and my motivation for pursuing it, and I outline the structure of my thesis.

1. Background and motivation

Paid online crowdwork has arisen as a novel form of digitally mediated work. Crowdwork includes the execution of tasks online by dispersed crowdworkers who are financially compensated by job providers. Job providers may be organizations, groups, or persons (Kittur et al., 2013). As such, "*crowdwork is a sociotechnical work system constituted through a set of relationships that connect organizations, individuals, technologies, and work activities*" (Kittur et al., 2013, p. 1302). Crowdwork is usually accomplished through platforms that allow job providers to seek workers and assist workers to seek work (Kittur et al., 2013). This information technology (IT)–supported work arrangement has turned into a multibillion-dollar industry (Durward et al., 2016b), allowing organizations (i.e., job providers or employers) access to a large number of workers and empowering individuals (i.e., crowdworkers) to behave as autonomous micro-entrepreneurs (Kittur et al., 2013). Intermediary platforms, job providers, and workers are the three main parties in crowdwork (online marketplaces) (Kittur et al., 2013). Crowdwork platforms mediate interactions between job providers and crowdworkers so that tasks can be provided and completed (Deng et al., 2016; Kittur et al., 2013).

So far, most studies on crowdwork platforms have concentrated on micro-task platforms, such as Amazon Mechanical Turk (AMT), which usually offer repetitive work requiring little skill and earning low payment (e.g., tagging pictures). Conversely, creative crowdwork platforms (e.g., Topcoder and Upwork), offer tasks that are more professional, complex and creative (e.g., graphic design and web development) (Deng et al., 2016). It takes longer to perform these tasks, demands a higher degree of skill, and provides workers with higher pay. In my thesis, I focus on creative crowdwork requiring elaborate information processing actions, such as teamwork, idea generation, data gathering, design of tasks, and discovering solutions (Thuan et al., 2015). Evidence indicates that such creative work platforms require a more complicated governance and work organization structure than routine work platforms (Vakharia & Lease, 2015). At the same time, creative crowdwork can help job providers obtain knowledge, skills, and innovations from an extensive anonymous crowd (Gol et al., 2019a; Tate et al., 2017). It can contribute to innovation, offer a strategic competitive advantage, and reduce costs of labor by offering job providers flexibility and fast

entry to a substantial source of skilled (and mostly inexpensive) laborers on a short-term basis. Crowdwork can provide job providers with access to scalable knowledge and creativity, as well as increase value capture and productivity (Anya, 2015). The fact that the dissemination and parallelization of tasks does not depend on time or location may reduce the time required for task processing substantially. Furthermore, extra productivity benefits such as industrialization and hyper-specialization are achievable for job providers due to the expansion of standardization and the division of large tasks into smaller tasks (Durward et al., 2016b).

However, getting value from crowdwork is difficult for job providers due to hurdles of governance and work organization (Gol et al., 2019a; Spreitzer et al., 2017; Thuan et al., 2015). Governance is often mentioned in crowdwork studies but without a firm definition. Broadly, *crowdwork governance* refers to different control and coordination systems, comprising policies, standards, and work practices (Deng et al., 2016, p. 281) that address task design, quality management, customers or platforms feedback, monetary and social incentives (Schörpf et al., 2017, p. 46). A review of crowdwork literature shows a lack of systematic studies related to mechanisms of crowdwork governance. Most of the studies on crowdwork have focused on the workers, including labor market conditions in the gig economy (De Stefano, 2016), and the perspectives of workers on routine platforms such as AMT (Brabham, 2010; Deng et al., 2016; Gol et al., 2019a; Kittur et al., 2013). Even less is known about crowdwork organization from the perspective of job providers and how the structures of work organization are formed and shaped across the combined practices of platform owner(s), job providers, and workers. In general, crowdwork, as platform-mediated work, suggests flexibility in three dimensions: (1) *flexibility in the employment relationship,* (2) *flexibility in the scheduling of work, and* (3) *flexibility in where the work is done* (Spreitzer et al., 2017, p. 1). This augmented flexibility is desirable to job providers since it offers economic benefits and may motivate the hiring of more contract workers over full-time workers (Bidwell, 2019; Davis, 2016). At the same time, managing these flexibilities requires novel work structures.

To conclude, for job providers deciding to apply crowdwork as part of their employment strategy, having knowledge about crowdwork and making informed choices about the ways to structure and manage the processing of information provided by the crowd is essential (Mattarelli et al., 2018; Nickerson et al., 2017). There is a threat of losing control and knowledge over the crowd's actions. Moreover, poor-quality work, untimely delivery of work, confidentiality concerns, workers' improper behaviors, misunderstandings about tasks on the part of workers, and difficulties in task division, work coordination, and supervision are other significant challenges for job providers. These challenges arise not only because the work is dispersed and short-term but also because of the platform-mediation of the work (Anya, 2015; Deng et al., 2016). Numerous existing challenges can be traced to the way crowdwork platforms function (in terms of contracts, ratings and communication options, to name a few); in short, they make arranging

crowdwork - its governance and work organization - difficult for job providers. As creative crowdwork utilization among job providers is on the rise, this thesis focuses on how to govern and organize this kind of work to add value for job providers. Beyond the most common existing crowdwork arrangement, in which the platform has a major role in governing and organizing work, this thesis explores emerging decentralized and agency-facilitated crowdwork arrangements in which not only the platforms but also the workers and job providers are involved in the governing and organizing of crowdwork.

2.   Research objective and problem statement

As discussed, crowdwork has the ability to transform the nature of work organization, as well as the nature of value creation (Durward et al., 2016b; Kittur et al., 2013). Although the numbers of crowdworkers are growing fast and providing many opportunities and challenges for job providers (Durward et al., 2016b), such as increasing their value capture and productivity (Anya, 2015), innovation, and strategic competitive advantages (Gol et al., 2019a; Tate et al., 2017), making value out of crowdwork for job providers is difficult because of governance and work organization challenges (Deng et al., 2016; Spreitzer et al., 2017).

In order to address these governance and work organization challenges that job provider organizations have in obtaining value from crowdwork, my research investigates established and emerging creative crowdwork arrangements that add value to job providers. Notably, although the present research distinguishes among routine and creative crowdwork (Buettner, 2015; Margaryan, 2016), it does not make it clear whether or how platforms govern routine and creative crowdwork inversely and how this can affect the value creation for job providers. Likewise, though research progressively identifies that governance by crowdwork platforms might be accomplished in a centralized or a decentralized way (Atzori, 2015; Hein et al., 2016), it is vague on how various governance mechanisms operate under centralized and decentralized modes. It is also unclear how the routinization of crowdworking is accomplished within job provider organizations to add more value for them. Consequently, to address current challenges regarding creative crowdwork arrangements, I explore the following overarching research question:

How is creative crowdwork governed and organized to add value for job providers?

Understanding how creative crowdwork is governed and organized to add value for job providers is a significant strategic issue for many businesses. This overarching research question is addressed through four studies. Study 1 focuses on the governance of current crowdwork arrangements. Study 2 focuses on how creative crowdwork arrangements are governed under centralized and decentralized modes. Study 3 focuses on the organizational value of crowdwork in large organizations, specifically focusing on the

absorptive capacity and the achievement via crowdworking routinization. Finally, Study 4 focuses on how the structures of work organization within creative crowdwork arrangements are formed.

My thesis contributes to advancing both theoretical and practical knowledge on crowdwork by identifying and describing three creative crowdwork arrangements from which job providers can benefit: (1) platform-centric arrangements, where the platform takes control of the whole process of governance and work organization; (2) actor-centric arrangements, where all actors within the ecosystem are involved in the process of governance and work organization; and (3) organization-centric arrangements, where the job provider organization, workers, and platforms collaborate in the process of governance and work organization through different crowdworking routinization models.

3.   Outline of the research and dissertation structure

In considering the main research question, my thesis comprises the following four studies, which present a comprehensive understanding of different crowdwork arrangements that govern and organize creative crowdwork to add value for job providers:

Study 1: Crowdwork platform governance and organizational value

Study 1 (Gol et al., 2019a) concentrates on understanding current crowdwork arrangements, focusing on adding value for the job providers through a review of state-of-the-art theories and developments. This study examines how crowdwork platform governance is conceptualized and practiced and how it contributes to organizational value creation. The study is guided by the following research questions:

RQ1: What are the governance mechanisms of (routine and creative) crowdwork?

RQ2: What is the organizational value created by crowdwork?

RQ3: What is the effect of centralized and decentralized governance on the organizational value of crowdwork?

Study 2: Different modes of crowdwork platforms governance

Study 2 (Gol et al., 2019b) is an empirical study exploring established and emerging creative crowdwork arrangements that add value for job providers, focusing on platform governance modes in more detail. The crowdwork platform governance mechanisms explored in Study 1, including control and coordination mechanisms, form the theoretical foundation of this study. The study focuses on empirically examining creative crowdwork governance under centralized and decentralized modes, as guided by the following research question:

> RQ1: How are creative crowdwork platforms governed under centralized and decentralized modes?

Study 3:   Organizational value of crowdwork in large organizations

Study 3 (Gol et al., 2020) is an empirical study that further explores the organizational value of crowdwork in large organizations, specifically focusing on absorptive capacity and the achievement through crowdworking routinization. Initially, Study 1 unpacked the current crowdwork arrangements by investigating from a theoretical perspective the relationship among mechanisms of crowdwork platform governance and organizational value creation. Next, Study 2 investigated established and emerging creative crowdwork arrangements by understanding the governance of creative crowdwork platforms under different degrees of centralization. Subsequently, incorporating knowledge from previous studies, this study explores how the routinization of creative crowdwork within the organizational work structure adds value for job provider organizations. The study is guided by the following research question:

> RQ1: How does crowdworking routinization contribute to absorptive capacity?

Study 4: Work organization on creative crowdwork platforms

Study 4 (Gol, 2020) is an empirical study investigating how work organization structures in creative crowdwork arrangements are formed and shaped through the combined practices of platform owners, workers, and job providers. Study 1 and Study 2 explored established and emerging crowdwork arrangements focusing on how crowdwork platforms, particularly creative ones, are governed via control and coordination mechanisms under different degrees of centralization. In Study 3, I investigated how

creative crowdworking is routinized within the organizational work structure to contribute to the absorptive capacity to add value for job providers. By investigating the structures of work organization in creative crowdwork arrangements, my thesis aims to address the research goal of how to organize value-adding creative crowdwork. This study empirically explores the work organization on creative crowdwork platforms under three dimensions of flexibility: (1) *flexibility in the employment relationship,* (2) *flexibility in the scheduling of work, and* (3) *flexibility in where work is accomplished* (Spreitzer et al., 2017, p. 1). This effort is guided by the following research question:

> RQ1: How is work organized on creative crowdwork platforms?

Together, the four studies contribute to a better comprehension of creative crowdwork arrangements by understanding the governance and the structure of work organization of creative crowdwork and providing more in-depth insight into the nature of crowdwork and the operation of crowdwork platforms. In practical terms, the studies can help forge a future for crowdwork that will be more attractive for both job providers and crowdworkers.

The next section introduces the relevant extant literature and the proposed research framework.

II.   Theoretical foundation

In this chapter, I describe the overall theoretical background for my research and the gaps in the existing literature, and this leads to the explication of the proposed research framework.

1.   Sharing economy and gig work

Crowdwork, the main phenomenon under study in my thesis, cannot be understood without considering the broader context of the sharing economy and gig work in which it belongs. The digital age has considerably changed employment relationships and added substantial legal ambiguity about what rules to use in cyberspace (Todolí-Signes, 2017). New kinds of businesses built on a "sharing economy" or an "on-demand economy" have emerged to connect customers with individual service providers directly (Todolí-Signes, 2017).

The sharing economy is one in which peer-to-peer exchanges are used on Internet platforms to rent properties or obtain services. Examples are Airbnb for tourist rentals and Uber for obtaining transportation;

others facilitate the sharing of assets, residences, and laborers in real time. These platforms are different from other e-commerce and social media platforms, which tend to facilitate peer-to-peer communications or commercial product transactions. Sharing economy enterprises create relations between organizations and people over time and space via the Internet. The intermediary platforms are multi-sided technological infrastructures that facilitate communications, interactions, and exchanges within a network. The platforms' primary goal is to be a matchmaker that facilitates the trade of services and commodities among peer groups (Evans & Schmalensee, 2016).

The sharing economy is also transforming the labor force by establishing a category of autonomous workers who depend on fragmentary gigs and have no employment benefits (Ganapati & Reddick, 2018). The new category of workers, or so-called part-time giggers, include those employed on an hourly basis via online platforms such as AMT. Therefore, the sharing economy refers to the "gig economy," or "on-demand economy," as well (Ganapati & Reddick, 2018). The impressive growth of the sharing economy over recent years has unsettled the normal working environment of industries and, subsequently, changed the meaning of employment (Ahsan, 2020). Gig work is intrinsically uncertain and associated with unstable employer–employee relationships. Depending on the market demand, gig workers may work full-time or part-time or be unemployed (Ganapati & Reddick, 2018). Gig workers are usually considered independent contractors instead of employees in legal terms, and gig economy platform owners celebrate this classification as a form of entrepreneurship (Ahsan, 2020). In the next section, the influence of crowdwork as a new form of digitally mediated work on changes in the nature of work will be discussed.

2.   Crowdwork and the new nature of work

Work is a cognizant and purposeful activity (Durward et al., 2016b). With the proliferation of enhanced information technologies, the world of work is transforming quickly (Barley et al., 2017; Forman et al., 2014). One key change is the increasing popularity of platform-mediated work, including crowdwork and gig work (Mulcahy, 2016; Taylor & Joshi, 2018). The sharpest growing segment of the alternative workforce is platform-mediated employment (Katz & Krueger, 2019).

The growth of digitization has connected the economy and other society parts at various levels, generating novel labor forms (Durward et al., 2016b). These new forms of digital work involve all activities in the creation of digital goods and services. Furthermore, because of the ever-continuing working processes digitization, organizations are progressively benefiting from new technological opportunities. From an organizational perspective, crowdwork can transform a permanent job into several project-based, contract-

level jobs performed by crowdworkers who choose the tasks they prefer. The crowdworkers have become a flexible pool (Durward et al., 2016a).

Crowdwork involves all kinds of compensated work arranged through online employment platforms (De Stefano, 2016; Donini et al., 2017). These platforms operate as an intermediary among job providers and labor to facilitate the explanation, submission, and approval of and the compensation for the work completed (Irani, 2015). AMT, Clickworker, CrowdFlower, Topcoder, and Upwork are examples of crowdwork platforms (Margaryan, 2016). The kinds of tasks suggested can vary remarkably. Research separates micro-work or routine crowdwork and online freelancing or creative crowdwork (De Stefano, 2016; Margaryan, 2016). Micro-work includes projects that have been divided into micro-tasks that can be completed in a short time, are usually repetitive, and do not need a high skill level (e.g., tagging pictures, filling out surveys (De Stefano, 2016). Micro-tasks are specified as "*stand-alone tasks*" with a "*clear definition*" (Buettner, 2015, p. 4611). A well-known example of a routine or micro-work crowdwork platform is Amazon's Mechanical Turk (AMT). Conversely, creativity includes innovative implementation (Woodman et al., 1993). Creative tasks consist of competitive works, idea generation, and evaluations that might be done by the crowd (Buettner, 2015). As such, creative work usually needs considerably more resources (e.g., time and skills) than routine work at different levels (e.g., organizational, team, and individual) (Rimmer, 2016). Online freelancing is an example of more creative crowdwork where job providers contract with dispersed workers for skilled services, such as mobile apps development and animation design (Margaryan, 2016). Upwork is a well-known online freelancing or creative crowdwork platform (Margaryan, 2016).

The roots of crowdwork are in outsourcing. Outsourcing is a strategy of using workers outside of an organization's internal employee base to make a product or provide a service that was formerly made or provided in-house (Prassl & Risak, 2015). Crowdwork imitates outsourcing in that it uses remote and external workforces. However, the workers are dispersed across the entire globe and depend on their own resources (via an Internet connection) to accomplish their work (Prassl & Risak, 2015). By providing access to enormously scalable workers, businesses have a level of flexibility that did not exist before (De Stefano, 2016). "*Workers are provided 'just-in-time' and compensated on a 'pay-as-you-go' basis; in practice, they are only paid during the moments they work for a client*" (De Stefano, 2016, p. 4). In the next section, the movement from outsourcing to crowdworking will be discussed.

3.   Moving from outsourcing to crowdworking

Crowdworking has emerged from outsourcing as a sharing economy, and associated platforms have become the new normal. Outsourcing refers to "*contracting with a service provider for the management and completion of a certain amount of work, for a specified length of time, cost, and level of service*" (Oshri et al., 2015, p. 4). Crowdworking includes the outsourcing of work. It is conducted by new kinds of firms in an on-demand economy or sharing economy. The work is usually available to many individuals in the form of an open call (Todolí-Signes, 2017). Therefore, in theory, these new firms only match a customer with a worker who will accomplish the job. Before the advent of new technologies, this type of outsourcing stage would have been impractical. The firms that offer outsourcing dedicate their business to creating an online platform (e.g., apps, a website) through which customers are able to directly find a worker with the attributes needed for a certain type of work (Todolí-Signes, 2017). Because the platform-owning companies serve only as a database by which a customer and a worker can connect, the workers that use them are categorized as self-employed (Todolí-Signes, 2017). Because these workers are not protected by employment laws, particularly laws regulating collective salary and minimum salary agreements, a customer can hire them at a considerably lower amount than a worker at a traditional company (De Stefano, 2016; (Todolí-Signes, 2017).

Crowdworking emulates outsourcing through its use of independent, often remote, workers. Outsourced workers are usually remote from the organization using them inside another company structure and generally co-located. Crowdworkers are scattered across the world and rely on their own resources to perform their work (Starbird, 2012). In order to outsource projects on online platforms, there is a need for a high-speed and reliable Internet connection, the possibility of digitalizing task packages, and clear task requirements. When crowdworking first began, the focus was on outsourcing micro-tasks that required no particular skills (Bergvall-Kåreborn & Howcroft, 2014; Schörpf et al., 2017) but did require a high level of modularization and standardization; thus, the work needed to be divided into small tasks that could be explained clearly (Kittur et al., 2013). As crowdworking developed, a need developed for workers who could perform complex or creative work that required a high level of skill and many processes, and this type of work has now become more widespread (Schörpf et al., 2017). There are platforms specially designed for creative jobs, such as 99designs and DesignCrowd. From the outsourcer's viewpoint, the benefits lie in the access to a vast pool of skills, talents, and creative abilities, as well as lower costs, high flexibility, and the option of hiring temporary workers (Schörpf et al., 2017). In the next section, the role of crowdwork platforms as intermediaries between crowdworkers and job providers, the platforms governance, and the work organization on the platforms will be discussed.

4. Crowdwork platforms

Crowdwork platforms can be classified as multi-sided platforms (Schmidt, 2017), operating as online markets that enable exchanges between different kinds of stakeholders who cannot otherwise organize transactions with each other (Gawer, 2014). For example, Upwork involves autonomous crowdworkers from the entire world who can connect with and demonstrate their skills and suggest their services (e.g., web design skills) to job providers. The exchanges are usually one-off transactions that are simplified and accelerated by the platform.

As an intermediary, the platform coordinates the supply-and-demand business facet (Schmidt, 2017). The platforms shift most of the responsibilities, costs, and risks to the other parties. They often offer just a virtual service (e.g., an app or a website) without supporting the labor expenses or production requirements (Schmidt, 2017). Simultaneously, the platform owners maintain the only and restricted control over the platform's rules, data, and processes. The platform coordinates jobs and services, which are not attached to specific places or people. Therefore, these platforms usually provide a high level of scalability, supporting distributed activities. These multi-sided platforms attributes (i.e., the temporary arrangements, the scalability, and the mediation between distributed sides) are illustrated in the attributes of the crowdwork done through the platforms.

Crowdwork platforms contain a governance structure that is essential for addressing the issues of managing a distributed and scalable workforce (Deng et al., 2016; Greengard, 2011) who is executing tasks that have conventionally been conducted by small, devoted groups in corporations (Deng et al., 2016; Kittur et al., 2013). The work processes such as instructions, configurations, task assignments are governed by crowdwork platforms to motivate workers' contribution and enhance worker productivity (Deng et al., 2016). Ambiguous task explanations and complicated interfaces can adversely affect work quality because they cause worker uncertainty about proper processes and expectations (Kittur et al., 2013). As the task complexity rises, the governance of work procedure can become more difficult. In conclusion, the factors that affect the success and value creation of crowdwork for job providers depend on both the work and the platform; they are usually challenging to split because of the dispersed, mediated, scalable, temporary work arrangements among workers and job providers. These issues will be discussed in the following sections.

Crowdwork platform governance

Platform owners, job providers, and workers are three main stakeholders in crowdwork. As mentioned before, for all three stakeholders, making value out of crowdwork is difficult due to various reasons.

According to many studies, workers drop out of crowdworking at high rates because of the low income, lack of a guaranteed steady salary, lack of insurance and pension benefits, unjust treatment, and absence of job security (Deng et al., 2016; Kittur et al., 2013; Ma et al., 2016; Taylor & Joshi, 2019), and this threatens the lasting sustainability of crowdwork. The main problems from a legal standpoint are classifying the connections among the platform, job provider, and workers (Donini et al., 2017). According to an organizational perspective, crowdwork changes permanent jobs into jobs done by a pool of workers who undertake works in a project-based way (Durward et al., 2016a). There is a danger of lacking knowledge of and control over the crowd's behaviors due to the scattered and temporary work and the intermediary platforms (Deng et al., 2016). Lots of these issues are related to the way in which crowdwork platforms function, with their temporary work agreements, technology-mediated actions, scalable and dispersed workforce; all of these factors make crowdwork platform governance tricky.

Platform governance refers to "*the set of legal, political, and economic relationships structuring interactions between users, technology companies, governments, and other key stakeholders in the platform ecosystem*" (Gorwa, 2019, p. 2). There are different definitions of the governance used for crowds and platforms. For instance, the "governance of the crowd" in various political systems includes controlling the crowd and discovering an efficient strategy for marshalling the resources of the crowd (Asmolov, 2015). Platform governance refers to two phases: the governance *of* platforms and the governance *by* platforms (Gillespie, 2017). The first phase focuses on the rules that platforms must follow to be an intermediary, and the second phase concentrates on the responsibility of a platform when it moderates users and content (Gillespie, 2017). Tiwana et al. (2010, p. 5) define platform governance as "*who makes what decisions about a platform.*" The definition of governance in crowdwork studies is not mature. Generally, crowdwork platform governance implies different control and coordination systems that comprise standards, policies, and work practices (Deng et al., 2016), concerning task management, feedback from job providers or platforms, quality management, and incentives and financial management (Schörpf et al., 2017). Attracting, coordinating, and controlling the corresponding parties attending the platform is vital for multi-sided platforms (Schreieck et al., 2016). Crowdwork platforms have general directive controls that guide behavior, as well as monitor workers' and job providers' performances and environments on the platform through standards, policies, and rules (Deng et al., 2016; Howcroft & Bergvall-Kåreborn, 2018; Manner et al., 2012). Moreover, crowdwork platforms coordinate the communications between workers and job providers (Howcroft & Bergvall-Kåreborn, 2018; Schmidt, 2017). Therefore, crowdwork platform governance involves control and coordination as two main facets.

In multi-sided platforms, control comprises the platform owner's approaches to monitor and supervise the platform's processes (Schmidt, 2017). Platform owners can affect exchanges among the parties by having access to data on all interactions (Schreieck et al., 2016). Crowdwork platforms utilize formal and informal

control strategies (Eisenhardt, 1985) via mechanisms such as quality and reputation control, among others (Schreieck et al., 2016). Formal control is accomplished through performance assessment (Eisenhardt, 1985), with outcome and behavior assessment being the two modes of formal control most often exercised. In addition, internalization of targets may be accomplished through a range of informal control mechanisms, including training, team building, confirmatory rules of human resources, and socialization (Kirsch, 1997).

In crowdwork platforms, coordination comprises mechanisms that attract workers and job providers (cf. Hagiu & Spulber, 2013) via managing dependencies among crowdwork functions (based on Crowston, 1997; Kittur et al., 2013; Malone & Crowston, 1994). Coordination generally refers to "*the act of working together harmoniously*" (Malone & Crowston, 1990, p. 5), but in governance, coordination and control are usually intertwined and are not easy to differentiate. For instance, from Mintzberg's (1980) five coordination mechanisms, three (standardization of outcomes, direct supervision, and standardization of work processes) correspond with formal control mechanisms, one (standardization of skills) corresponds with mechanisms of informal control. Only one, common adjustment, where workers' functions are coordinated through informal communications with each other (Mintzberg, 1980), indeed acts as a coordination method. On crowdwork platforms, coordination is needed to manage dependencies between resources and tasks in the process (Crowston, 1997). For instance, complicated tasks may have to be divided into sub-tasks; multiple crowdworkers may be acting on the consecutive or the same tasks, and this sets constraints on their activities and requirements on their communications with each other (cf. Kittur et al., 2013). To address these coordination challenges, platforms must apply additional actions that are not part of formal and informal controls.

Organization of work on crowdwork platforms

The work design and organization of work have been studied by scholars in information systems (IS) since the Tavistock studies of the 1950s, which advocated for the cooperative optimization of the technical and social sub-systems at work (Trist & Bamforth, 1951). Since then, we have examined much about how the organization of work is performed in traditional work (Hackman, 1980; Spreitzer et al., 2017; Winter et al., 2014). However, the realm of work is transforming quickly with the increasing popularity of the gig economy and crowdwork (Mulcahy, 2016; Katz & Krueger, 2019). Yet, there is nothing but anecdotal indication regarding how work organization is done on crowdwork platforms, especially on creative ones including more complex tasks such as graphic design and mobile apps development (Gol et al., 2018; Margaryan, 2016). Because creative crowdwork requires elaborate information processing endeavours such as idea generation, data gathering, task management, group-working, and solution discovering (Thuan

et al., 2015), it also needs a sophisticated organization that can cope with its innate socio-technical complexity.

The organization of the work structure on crowdworking platforms is different from that in "regular" organizations for various reasons. For instance, crowdwork is normally processed on and supported by online platforms and is not accomplished face to face. Moreover, organizations usually do not know the crowdworkers who perform their work, and the crowdworkers do not know each other. Crowdworkers have diverse skills and educational backgrounds and are dispersed among various countries and time zones. Another major characteristic of the work structure on crowdworking platforms that is different from that in regular organizations is that work is not given to workers; instead, crowdworkers select their work themselves (Mrass et al., 2018).

Flexibility is a substantial element that separates crowdwork from traditional work in that it enables workers to have control over how, when, and where the work is performed (Gol et al., 2019a; Spreitzer et al., 2017). As argued by Spreitzer et al. (2017), alternative work arrangements, such as crowdwork, have three dimensions of flexibility. The first dimension is flexibility in the employment relationship. Contract workers (including crowdworkers) are usually employed to complete a short-term project related to their knowledge and skills (Spreitzer et al., 2017). Instead of a guaranteed monthly salary, workers are compensated by the hour or the project as specified in a contract by the job provider (Gol et al., 2018). The second dimension is flexibility in the scheduling of work. Crowdworkers usually have substantial flexibility in scheduling work, specifically in when they decide to apply for a new project. For instance, many highly skilled crowdworkers take time off after a big project before they start a new one. Having control over the time spent on work and the timing of breaks has significant positive implications for the recovery from work exhaustion (Spreitzer et al., 2017). The third dimension is flexibility in the location in which work is done. The crowdworker has control over choosing where to work at a job (including being away from the job provider or employer) (Gol et al., 2018; Spreitzer et al., 2017). Platform-mediated contracting, as in creative crowdwork, contains all three dimensions of flexibility (Spreitzer et al., 2017).

Under the three flexibility dimensions, work organization is a significant challenge since it must be accomplished to manage and strengthen these dimensions simultaneously. The challenge lies also in that the organization of work is not achieved only by the platform owner's actions but also through the daily actions of the job providers and the workers. Therefore, organizing work under conditions of flexible employment relationship, flexible scheduling, and flexible location requires knowledge of how the platform owner, job providers, and workers all perform certain activities, which together make work under these flexible dimensions possible.

5.   Crowdworking as a driver of open innovation and absorptive capacity

This section discusses crowdworking as a new open innovation that increases access to knowledge and labor beyond an organization's boundaries (Ellmer & Reichel, 2018) and adds value for job provider organizations by increasing their absorptive capacity.

Recent management paradigms such as open innovation identify flexible possibilities for adding superior innovations and value beyond organizational boundaries and reveal how effectively these possibilities can be used (Ellmer & Reichel, 2018). The current boundaries between firms and their environments are blurred by their expanding access to laborers and knowledge outside of the firms. Subsequently, novel hybrid forms of work coordination are created (Ellmer & Reichel, 2018). There are two types of open innovation: inbound and outbound. Inbound open innovation refers to external knowledge flowing into the corporation, while outbound open innovation refers to knowledge flowing out of the corporation (Chesbrough & Brunswicker, 2014). Open innovation research indicates that the ability of firms to absorb external knowledge is essential for reaping the benefits of open innovation because it is a key driver of competition (Spithoven et al., 2010).

Crowdworking can be considered as an inbound open innovation (Ellmer & Reichel, 2018). Crowdworking can shift the way organizations operate at a certain time and add value for them by utilizing the "wisdom of crowds"; this goes beyond using the crowd only as a cheap, flexible resource (Ellmer & Reichel, 2018; Mrass et al., 2018). Creative crowdworking that involves complex projects with extensive project management requirements always includes co-creation between the job provider and the workers (Gol et al., 2019a; Margaryan, 2016; Thuan et al., 2015). Co-creation refers to the collaboration between a job provider and highly skilled workers or experts to achieve the promise of great ideas (Chiu et al., 2014). However, the aim of creative crowdworking is not only the absorption of ideas but also the taking advantage of the talents of the workers. Thus, creative crowdworking increases access to the tacit (implicit) knowledge of workers beyond the organization's boundaries (based on Chiu et al., 2014). Creative crowdworking involves absorbing the tacit knowledge of talented crowdworkers while undertaking complex projects requiring many non-standard work practices and much coordination, such as data gathering, task management, task design, ideation, feedback, quality assessment, and teamwork (Gol et al., 2019a; Margaryan, 2016; Thuan et al., 2015).

Crowd-based systems integration within organizations is highly complicated due to the existing structures of work and performance targets. Those are closely intertwined with organizations' functions in the traditional model, whilst crowdworking leverages an indeterminate group of workers without a coordinated managerial or hierarchical model (Anya, 2015). Most existing research on crowdworking focuses on

micro-tasks; few studies have focused on complex macro-work and how to develop structures to support higher levels of innovation in crowdworking by means of a complex governance and work organization (Anya, 2015; Mattarelli et al., 2018; Thuan et al., 2015). Little is known about the ways to best structure and manage the processing of information provided by the crowd (Mattarelli et al., 2018), and this can hinder the ability of organizations to identify, assimilate, and use new knowledge within the organization (Ahn et al., 2016; Cohen & Levinthal, 1990). Thus, understanding the governance and work organization by examining the routines created around crowdworking is essential in helping job provider organizations reap the benefits of crowdworking, not only in terms of cost savings but in the cultivation of their capabilities of absorptive capacity (Vanhaverbeke et al., 2008).

Absorptive capacity is an organization's ability to examine the environment to locate novel opportunities and knowledge and to leverage these assets in its innovation process (Ahn et al., 2016). Specifically, absorptive capacity is "*the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends*" (Cohen & Levinthal, 1990, p. 128). As such, absorptive capacity includes three dimensions: "*identification, assimilation, and exploitation of external knowledge*" (Vanhaverbeke et al., 2008, p. 14). The first dimension, identification, is a company's ability to identify and assess new external knowledge (Cohen & Levinthal, 1990; Vanhaverbeke et al., 2008). The communication structure between the firm and external sources of knowledge, as well as that among the firm's subunits, has a vital role in identifying sources of new external knowledge (Cohen & Levinthal, 1990). In addition to discovering new knowledge, the capability to identify the value of the knowledge is a substantial component of identification and is necessary to trigger the absorption of such knowledge (Todorova & Durisin, 2007).

The second dimension, assimilation, is the ability of a company to take in new external knowledge. Even if an organization is able to identify new knowledge and assess its value, the organization may find it challenging to absorb that knowledge (Cohen & Levinthal, 1990; Vanhaverbeke et al., 2008). Assimilation enables organizations to process, and internalize, externally created knowledge (Zahra & George, 2002). Transformation is a complementary dimension of absorptive capacity that follows assimilation. It explains why and how firms are able to change their routines to absorb new knowledge that is not similar to their prior knowledge (Todorova & Durisin, 2007; Zahra & George, 2002). In sum, the absorption of external knowledge may iterate among transformation and assimilation processes multiple times before new knowledge is successfully integrated into existing organizational knowledge structures and prepared for exploitation (Todorova & Durisin, 2007).

The third dimension, exploitation, is the ability of a company to commercialize the new external knowledge to achieve organizational goals (Cohen & Levinthal, 1990; Vanhaverbeke et al., 2008). The main emphasis

here is on the routines that allow organizations to exploit knowledge (Zahra & George, 2002). Exploitation refers to an organization's capability of harvesting and integrating knowledge into its operations. It involves retrieving knowledge that has already been generated and internalized for usage. The continual creation of new knowledge is the consequence of systematic exploitation routines (Zahra & George, 2002). Although obtaining knowledge from external sources is significant and prevalent among organizations, managing a relationship with external sources, finding the suitable persons (know-who) with the right knowledge and skills, and, particularly, integrating and applying the new knowledge remain considerable challenges. Internal ability and external contribution are considered as complementary in addressing these challenges. Internal ability refers to the internal processes of the organization, whereas external contribution refers to the boundary-crossing relationship between the organization and its partners (Nooteboom et al., 2007). Both require new routines in the organization. Furthermore, the existence of appropriate external sources of knowledge does not mean that the inflow of new ideas and talent into the firm is a simple process. External knowledge is successfully identified, accessed, and assimilated only when organizations manage to create new routines and revise their culture and organizational structure to facilitate the processes of open innovation (Vanhaverbeke et al., 2008). A comprehensive understanding of how a new work form of inbound open innovation such as crowdworking is governed and organized to contribute to absorptive capacity thus involves a clearer understanding of these routines, mechanisms, and structures (Vanhaverbeke et al., 2008).

III. Research Design

In this chapter, I outline the research paradigm and methodological principles that have guided my scientific endeavors. I introduce the methods used for conducting the four studies. I also describe the techniques utilized for data collection, demonstrate an overview of the collected data, and present the techniques applied for data analysis. Finally, I present the criteria for assessing the validity and rigor of my research.

1. Research paradigm

I adopted positivism as the guiding paradigm. A positivist stance is one of the recognized, elaborated, and adapted research paradigms for qualitative studies (Paré, 2004). Positivist and interpretivist are the two traditions that are encompassed by qualitative research (Lin, 1998). There are distinctions between interpretivist and positivist qualitative studies that refer to the queries one asks of the data and the kinds of

outcomes one desires to gain. Both types of qualitative studies seek details about favorites, actions, and motives that are not simply made numeric (Lin, 1998). Interestingly, in a positivist study, the details are found via propositions that later can be examined or found in additional cases, whilst in an interpretive study, the details are merged into belief systems where expressions are particular to a case. Although in positivist and interpretive studies overall relationships or principles are argued, in the end, positivist work performs this by finding overall patterns, whereas interpretivist work performs this by demonstrating how, in practice, the overall pattern appears (Lin, 1998).

There is an argument that a positivist stance adoption is complemented by a strong promise to the notion that the natural sciences should be imitated by the social sciences (Lee, 1989a; Orlikowski & Baroudi, 1991; Paré, 2004). The ontological belief in a positivist study is that there is "*an objective physical and social world that exists independent of humans, and whose nature can be relatively unproblematically apprehended, characterized, and measured*" (Orlikowski & Baroudi, 1991, p. 9). Positivist research includes exploring objective reality by creating criteria that help identify those facets of reality on which scientists focus. Comprehending a phenomenon is, therefore, mainly a challenge of modeling and measurement in positivist research (Paré, 2004).

By distinguishing the individual components of a phenomenon and explaining its constructs, as well as the relationships among constructs, positivist epistemology tries to comprehend a social setting. The theoretical constructs explaining the phenomenon are separate from empirical reality. Consequently, empirical observations are utilized for examining a theory (Cavaye, 1996). Positivism concentrates on evidence, theoretical grounding, and the persuasiveness of logical argument and therefore highlights rigor in research. Although a positivist stance is not conventionally utilized for case research, it can be used in this type of research (Cavaye, 1996). The quasi-experimental usage of case research, as well as the use of case research as a natural experiment, has been discussed by Lee (1989b) and Yin (1989). In an epistemological way, positivist studies assume the presence of fixed relationships inside the phenomenon that can be recognized and assessed through hypothetical-deductive analysis and logic (Paré, 2004).

Positivist studies may discover causal relationships existing in data. Exploring causal relationships is the positivist research province (Lin, 1998). One does not understand how pervasive the presence of a similar case might be without a positivist study (Lin, 1998). The foundation of generalized knowledge refers to causal relationships that can forecast behavior patterns across circumstances (Paré, 2004). In addition, positivist scientists believe that "*scientific inquiry is 'value-free' and, hence, see themselves as impartial observers who can evaluate or predict actions or processes objectively*" (Paré, 2004, p. 235). According to these views, a positivist case study is performed by applying suitable quantitative and/or qualitative measures for the concepts being investigated; creating or assessing causal relationships; ensuring that the

investigation is value-free; and specifying the area where the results of the research are generalized (Paré, 2004).

Unlike in critical and interpretive case studies, the criteria for assessing the value of positivist studies are associated with the traditional reliability and validity assessments applied in the natural sciences (Paré, 2004). Positivism uses four key research evaluation criteria: the appropriate research findings should be generalizable, should be able to be replicated, should provide controlled observations, and should apply formal logic (Cavaye, 1996). "*Case research cannot manipulate variables in order to make controlled observations, but use can be made of naturally occurring controls (e.g., by studying different instances of the phenomenon within one firm or within one industry)*" (Cavaye, 1996, p. 233). Positivist case research cannot suggest a precise replication of the case setting and events. However, it is likely to expose case research findings to the replication logic. Results can be reproduced by using a similar setting to achieve similar outcomes for logical replication, as well as by using a dissimilar setting to achieve different results for theoretical replication (Cavaye, 1996).

Positivists consider generalization as the indicator and the aim of causal study. They believe that if the causal relationship cannot be reproduced in another set of data, the scholar must infer that something might be wrong with the sets of observations or the overall relationship and its working realization (Lin, 1998). Statistically, because a case or cases cannot be counted as population representative, positivist case research results cannot be generalized to a population. Case research can assert theoretical generalizability, however (Cavaye, 1996). Outcomes of cases are utilized to create theoretical statements in order to build a theory; later, if it is essential and critical, the theory can be examined for statistical generalizability. Because case data are mainly qualitative in positivist case research, there is no need to apply statistical data manipulation. Logic can be applied to qualitative evidence and oral statements and does not require quantitative evidence. Thus, formal logic is applied in the case research analysis (Cavaye, 1996). "*In the positivist case, uncertainty can be reduced through a research design that compares as many observations as possible on what the hypothesis predicts will be essential dimensions. Careful consideration of implications of the analysis is also necessary to see those alternative explanations, and thus important omitted dimensions or aggregated concepts are ruled out as causes*" (Lin, 1998, p. 171).

My thesis is based on a review of positivist state-of-the-art theories and developments to conceptualize the governance of crowdwork platforms. Because crowdwork is a contemporary phenomenon and there is a need for new and adapted theories about it (Gol et al., 2019a), I opted for qualitative research to expand and build such a theory. Subsequently, I applied single, multiple, and embedded exploratory positivist case studies (Paré, 2004; Yin, 2003) to study different creative crowdwork arrangements and how they add value for all stakeholders, focusing mainly on job providers. My thesis presents propositions that could be

the subjects for subsequent empirical studies (Yin, 2003). It also investigates crowdwork as a contemporary phenomenon and establishes appropriate qualitative measures for the constructs being studied, including creative crowdwork governance, work organization, and the routinization of crowdworking in organizations, as described below.

2. Methodology

I applied qualitative case study research as my overall research methodology (Paré, 2004; Yin, 2003). Using qualitative research approaches to investigate phenomena of information technology is rapidly becoming more common, and case study research using those qualitative approaches has gained acceptance in the IS field over the past decade (Dubé & Paré, 2003). Qualitative case study methodology enables researchers to explore and investigate a complex phenomenon within its context using various data sources (Baxter, 2008). This approach provides us with various lenses that might reveal and explain multiple facets of the phenomenon (Baxter, 2008; Yin, 2003). Qualitative research strengthens in-depth theorizing for examining and exploring the main phenomenon by looking at several cases (Yin, 2009).

Case research caught my attention for multiple reasons: First, remarkably, the case research method is suitable for IS research because it allows one to investigate IS in organizations from the organizational point of view instead of the systems' technical issues (Dubé & Paré, 2003). Second, by getting access to and observing real-life crowdworking experiences, I am able to contribute to both practical and academic ways of dealing with the rapid changes in IT and in organizations (Dubé & Paré, 2003). Third, a comprehensive study based on case research helps reveal pervasive and complicated interactions among workers, crowdworking platforms, and job providers. Thus, the access to and utilization of various qualitative data collection methods brings vividness and elasticity to the whole process of study, making case research especially suitable for the investigation and study of crowdwork as a complicated phenomenon (Dubé & Paré, 2003). Fourth, thorough case studies provide new routes of thinking and identify the challenges and opportunities confronting managers and IT specialists. Lastly, case research is broadly utilized for making discoveries and creating hypotheses. It can explain and assess hypotheses (Dubé & Paré, 2003; Yin, 2009) that contribute to the development of knowledge in the IS field.

In order to answer the main research question, I utilized various cases to obtain a comprehensive understanding of established and emerging creative crowdwork arrangements and how to govern and organize creative crowdwork to add value for job providers. I examined various theoretical perspectives by adopting the following methods of inquiry: A theoretical review strategy was used in Study 1 to understand the governance of current crowdwork arrangements through the review of state-of-the-art

27

theories and developments; a comparative case study was used in Study 2 to explore established and emerging creative crowdwork arrangements with a focus on centralized and decentralized modes of platform governance; a longitudinal embedded case study was used in Study 3 to explore the organizational value of crowdwork in large organizations, specifically focusing on absorptive capacity and its achievement through crowdworking routinization; and a longitudinal case study was used in Study 4 to investigate how the structures of work organization within creative crowdwork arrangements are formed and shaped through the combined practices of platform owner(s), workers, and job providers.

Theory review and development

In order to understand the governance of current crowdwork arrangements, which is the main objective of Study 1, I developed a state-of-the-art theoretical review about how the governance of crowdwork is practiced and conceptualized. I also investigated possible theoretical extensions. Study on crowdwork is increasing, and most of it has been performed beyond the IS arena. Because of the enormity of the crowdwork literature, I restricted the primary sample of studies to those where both governance and crowdwork platforms were the main themes. Consequently, to evaluate the literature in terms of patterns and themes regarding the crowdwork platform governance, I applied a theoretical review strategy (Paré et al., 2015).

My review includes empirical and conceptual papers presented in journals and at conferences, either in or out of the IS arena. In this way a variety of patterns are revealed regarding how crowdwork platform governance is investigated and conceptualized. This is shown in the Appendix (see Paper 1: Tables A.1, A.2, and A.3). I utilized these tables as the foundation for the following analysis to find themes and gaps in crowdwork platform governance study and paths for future research. I applied Webster and Watson's (2002) approach to build the matrices of literature-based concepts that show the thematic terrain. Then, for developing a conceptual model that depicts the relationships between concepts, I applied Rowe's approach (2014).

Literature Search

To detect related literature for this study, I utilized the suggestions of Webster and Watson (2002) and Rowe (2014). A wide set of scientific databases, including Proquest, EBSCO, Scopus, Google Scholar, ACM DL, AISeL, and IEEE Xplore, constituted the main data source. I searched for titles, abstracts,

keywords, and full texts employing the subsequent search terms: ("crowdwork" OR "crowdsource" OR "crowdworker") AND "governance"; ("job provider" OR "job requester") AND "governance"; ("digital labor" OR "digital labor platform" OR "online digital market*" OR "Amazon Mechanical Turk") AND "governance." This method guaranteed that the preliminary sample of studies consisted of only the articles wherein governance and crowdwork were central themes. Targeting for high-quality publications, I started by concentrating on papers from the Association for Information Systems (AIS) Senior Scholars' Basket[1] and selected IS conferences. Next, I expanded the search scale to adjacent disciplines, including social sciences, computer science, law, and economics and finance. I also used papers presented at conferences of Association for Computing Machinery (ACM) and the Institute of Electrical and Electronic Engineers (IEEE).

I chose relevant papers for further analysis by reading the abstract of each paper and skimming the contents entirely. I excluded papers on unpaid crowdsourcing. I considered papers that clarified crowdwork platform governance, and I omitted papers that only stated the governance term without examining the phenomenon. Since the worker viewpoint dominates the literature on crowdwork, I selected only most-cited or previous review papers regarding the worker viewpoint. Ultimately, after many related papers had been detected, I applied a snowballing approach to ensure I had not skipped an important source (Wohlin, 2014). This approach ended in the final sample of 78 related papers examining crowdwork platform governance and the value of that for job providers.

Data analysis

According to the review of the related papers, I first created a categorization of prior studies built on their general focus and viewpoint on platforms, crowdworkers, and job providers (see Paper 1: Tables A.1 and A.4 in the Appendix). Many papers on crowdwork platform governance emphasize the worker viewpoint (Nickerson, 2014), and they have less focus on the viewpoints of the platform owner and the job provider. Numerous papers consider crowdwork from more than one stakeholder's viewpoint, usually concentrating on the job provider and worker or the platform owner and the worker. A few papers also present a complete perspective by studying all three stakeholders' concerns (see Paper 1: Table A.1 in the Appendix).

Second, through coding the selected papers inductively, I produced a categorization of crowdwork platform governance mechanisms. I commenced by detecting all the various potential governance mechanisms declared in the papers. The preliminary list of codes involved reputation, payment rules, incentives,

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[1] See https://aisnet.org/?SeniorScholarBasket

decision rights, contractual rights, shared resources management, producer/consumer management, task/sub-task relationships, fairness, transparency, and accountability (see details in Paper 1). Next, I categorized related codes and excluded those that were rarely declared and not explained in detail in previous literature, making it challenging to express their importance in crowdwork platform governance. By iterating backward and forward among the results and the definitions of governance from current research, I (1) distinguished governance mechanisms and their drivers and (2) suggested control and coordination as two main mechanisms of crowdwork platform governance (see Paper 1: Table A.2 in the Appendix). Due to the theoretical and practical importance of the degree of centralization and the degree of routinization of work on crowdwork platform governance, I also coded the papers for their focus on centralized, decentralized, and hybrid governance and routine and creative crowdwork. Mainly, I discovered that most papers focus on centralized governance of routine crowdwork, and no papers on solely decentralized crowdwork governance (see Paper 1: Table A.2 in the Appendix).

Third, I examined the chosen crowdwork papers focusing on finding the value propositions for job providers. The preliminary list of codes consisted of fast task completion, technological efficiency, high quality of work, lack of long-term commitment, economic benefit, and scalability (see details in Paper1). Next, I categorized related codes and excluded those that were rarely stated and not included in-depth in previous literature. I finalized five value propositions (see Paper 1: Table A.3 in the Appendix). Combining insights from Tables A.1, A.2, and A.3 (in the Appendix), I developed the conceptual model for crowdwork platform governance.

Comparative case study

To explore established and emerging creative crowdwork arrangements, I applied a comparative case study to investigate how insurgent and incumbent creative crowdwork platforms are governed under centralized and decentralized modes. I utilized a comparative case focused on the comparison of two distinct cases that allowed centralized and decentralized creative crowdwork platform governance to be compared. A comparative case study provides the ability to make a context-based comparison in contrast to a single case study and thereby draw more robust inferences (Yin, 2013).

I studied the Topcoder and CanYa platforms. I selected Topcoder since it is a popular creative crowdwork platform with a mostly centralized governance structure. Topcoder attracts many highly skilled workers and works with numerous large corporations, such as Google and IBM, and large government agencies, such as the National Aeronautics and Space Administration (NASA), as job providers. Topcoder runs software development, software design, and online algorithm competitions (Archak, 2010). The platform

involved 1.2 million workers in December 2017, and this number is rising by 50,000 workers every quarter (Talley, 2017), as stated by Mike Morris, Topcoder chief executive officer (CEO).

In contrast, I selected CanYa since it is a pioneering platform built on blockchain technology. It is an open ecosystem that hosts a market of peer-to-peer services and contains decentralized apps utilizing blockchain technologies (CanYa Services Pty, Ltd., 2018a). CanYa is a member-owned, lightly formed entity that aims to operate as a decentralized autonomous organization (DAO). Therefore, building on a lean organizational configuration, CanYa intends to run a profitable crowdwork platform charging its members 20 times less than other crowdwork platforms (CanYa Services Pty, Ltd., 2018a). The platform consisted of 1,300 workers in August 2018 and is increasing rapidly, as stated by the CanYa community manager. Consequently, these two cases demonstrate two radically distinct governance modes and create an ideal setting to conduct the comparison.

Data collection

In the case of Topcoder, data collection was done in February and March 2018. I performed 16 semi-structured and open-ended Skype interviews with workers, job providers, and staff. Each interview was 40 to 50 minutes long. Furthermore, online data were collected from the website of the platform, the Slack community channel, and Topcoder forums utilized by staff and workers. In the case of CanYa, data collection was conducted in September and October 2018. I performed eight semi-structured Skype interviews with workers and staff. Each interview was 40 to 60 minutes long. As another significant data source, white papers regarding the platform were utilized. Online data were collected from the website of the platform, Telegram community channel, and CanYa blog utilized by workers and staff. Detailed and complete information concerning the interviewees is shown in Paper 2: Table 1 in the Appendix.

Data analysis

I used the case study research strategy to concentrate on the two cases to provide a deeper understanding of the crowdwork platform governance dynamics (Eisenhardt, 1989). To understand the case stories and evaluate and coordinate data collection through the cases, I performed within-case analysis (e.g., ensuring that data were available in each case regarding the same governance mechanism). The data analysis was done utilizing the same approach within the two cases. I used the procedures suggested by Huberman and Miles (1994) to conduct qualitative data analysis. I performed iterative coding, initially by open coding

and then by categorizing and modifying the codes relying on both data and theory. As indicated by both the literature and the data exploration, I coded for particular governance mechanisms regarding control and coordination (e.g., quality control, reputation system, task management, contract management, incentive management, motivation, skill, bonuses, rewards, payments, and complaint handling). New factors not revealed in prior literature, for instance, payment systems and dispute resolution, appeared from the data. I conducted data categorization based on the concepts of control and coordination, as well as centralized and decentralized governance modes (see Paper 2: Table 2 in the Appendix).

Longitudinal embedded case study

In order to explain how crowdworking routinization adds value to a large organization (i.e., job provider) by contributing to the absorptive capacity, which is the main goal of Study 3, I adopted the case study method, which builds a theory inductively and is grounded in empirical data (Eisenhardt, 1989). I opted for the embedded case study approach (Yin, 2009) because the study case (Pharma) included more than one unit of analysis in a single case and the embedded design allowed me to explicitly consider variations across sub-units within the case (Yin, 2009). Pharma is involved with two different crowdworking platforms (Upwork and Proteams) and is putting different routines and structures into place for the two partnerships. Based on this I identified two different models of crowdworking routinization that became the units of analysis: internal and external. This design provided a strong foundation for theory building. The embeddedness of the two units of analysis in the same context of Pharma allowed for meaningful comparisons across the crowdworking routinization process and its impact on absorptive capacity, and the diversity discovered in the routinization process and its impact provided a reasonable basis for generalizability.

I conducted this study on a large multinational pharmaceutical company, headquartered in Europe, with approximately 42,000 employees in 80 countries across the world. The name of the company has been disguised to maintain confidentiality (from here on I refer to the company as Pharma). It is a context well suited to crowdworking research for two main reasons. First, Pharma is known for its knowledge-based excellence, as well as a strong drive for innovation. It is, thus, an organization that values and strives for open innovation and can benefit greatly from an excellent absorptive capacity. Second, it is one of the first mature organizations across the world that is applying crowdworking on a large scale and a continuous basis as part of its strategy to strive for knowledge-based excellence and strong innovation. In order to do this, Pharma has started to transfer its complex projects (e.g., web development and translation), which used to be conducted through traditional outsourcing at a high cost, to creative crowdworking platforms. It is expected that crowdworking will have a substantially lower cost and faster delivery but with the same

or higher quality. Pharma developed and implemented a corporate crowdworking website (referred to as CCW from here on) for their own employees; it is an entrance gate from which they are directed to the crowdworking platforms that have signed a collaboration contract with Pharma (Upwork and Proteams). Pharma established its CCW in September 2018. Approximately 270 projects in different categories (mostly software development, data visualization, translation, and video making) have been completed through the two crowdwork platforms so far.

Upwork (founded 2015) is a well-known and successful creative crowdwork platform with a large pool of highly skilled workers (almost 12 million) from across the world. It serves the market for various kinds of skilled jobs (e.g., design and translation, development, accounting, sales). Upwork collaborates with Pharma as an external crowdwork platform with no access to Pharma's internal systems. Proteams (founded 2016) is a creative crowdwork platform with a small number of highly skilled workers (approximately 1,400) that deals with IT projects (e.g., web development, mobile app development, data analysis, and robotic process automation). Proteams collaborates with Pharma as an internal crowdwork platform; two of the Proteams project managers and a few freelance workers are located at Pharma. Proteams also has access to Pharma's internal system based on project requirements.

To take on projects through the crowdworking platforms, Pharma employees first open the CCW. They fill in a request form provided for them there, which includes questions on the category of the project (e.g., software development, translation, video making), title of the project, description of the project, and level of confidentiality (ranging from "strictly confidential," to "confidential," to "internal use," to "public"). Based on this information, the CCW directs the employee to the suitable crowdworking platform. For instance, if a project has a low level of confidentiality, such as a translation or e-learning project, the employee automatically gets direct access to create an account on Upwork. This allows the company to find the best workers and make a contract with them directly. On the other hand, if a project includes confidential data, the employee is directed to CCW administrators, who investigate which platform is best suited for this kind of project and let employees know whether they should use Upwork or Proteams. If Proteams is chosen, the CCW administrators introduce the employees to the Proteams' project managers to begin negotiations about project specifications.

Data Collection

In order to explore how crowdworking routinization contributes to absorptive capacity, I collected data based on semi-structured interviews, participant and field observations, and casual interactions. This effort was supported by an open-ended and theory-driven thematic analysis (Bowen, 2008) to gain a profound

and comprehensive understanding of this emerging phenomenon (Eisenhardt, 1989; Walsham, 1995; Yin, 2009). I conducted 37 open-ended and semi-structured interviews face to face or via Skype with the CCW team, Pharma employees, and staffs at Upwork and Proteams. Data were gathered over an approximately 6-month period extending from June to November 2019, and the length of each interview was between 30 and 60 minutes. I recorded and transcribed all the interviews.

For the CCW team, I interviewed the head of the team, purchasing manager, and associate manager. At Pharma, I interviewed employees who had used the CCW to approach the crowdworking platforms to complete a project. The employees were from different countries (i.e., Denmark, Brazil, United States, China). At Upwork, I interviewed the project manager who was assigned to work with Pharma and a technical support staff member who was available on the CCW to help Pharma employees. The staff members of Upwork were located in the United States, but they were assigned to work with Pharma remotely. For the Proteams staff, I interviewed the project manager who was placed at Pharma permanently (he is also one of the co-founders of Proteams) and one of the Proteams freelance workers, who was placed in-house at Pharma.

Additional data were collected in several ways. One was in formal meetings among the first author, CCW associate manager, and CCW team, as well as a meeting among the first author, CCW team, and three professional guests that focused on holding an event to showcase Pharma's utilization of crowdworking to the world. Data were gathered through informal conversations with the CCW team about crowdworking at Pharma, as well as emails and phone calls between the first author and the CCW team and staff members of Upwork and Proteams. In addition, documents including the descriptions of the platforms, the general description of crowdworking at Pharma, sample contracts, and reports on ongoing and completed crowdworking projects were collected and examined. Over 9 hours of observational data were collected through participation in CCW team meetings with Upwork and Proteams, as well as through the exploration of confidential CCW content via one of Pharma's internal computers. The overview of the collected data is presented in Paper 3: Table 2 in the Appendix.

Data analysis

To perform qualitative data analysis, I applied the processes delineated by Miles and Huberman (1994), whereby coding is conducted in two key stages. In the first stage, initial codes are assigned to the data and grouped into meaningful categories, themes, or constructs. In the second stage, the categories and themes are contrasted and compared to build the explanation (Miles & Huberman, 1994) of how crowdworking routinization contributes to absorptive capacity.

Preliminary data analysis was conducted during the interviews to enable iterative adjustments to interview questions at later stages and follow-up questions posed through e-mails and telephone conversations. Once the data collection was complete, I coded and analyzed the data from the interview transcripts, observation notes, online quotes, and documentary evidence. In the first stage, I focused on open coding of the crowdworking routinization process (identifying different crowdworking routinization activities) (see Paper 3: Table A.1 in the Appendix) and the examples of the different dimensions of absorptive capacity at Pharma (see Paper 3: Table A.2 in the Appendix). Then I categorized and refined the codes according to both theory and data to arrive at the key activities in the routinization process in the different units of analysis (e.g., centralized vs. decentralized communication structure, mediated vs. direct access to the pool of workers, facilitated vs. self-service project management) and key dimensions and components of absorptive capacity (e.g., assimilation dimension with internalization as a component). In the second stage, I focused on explanation building (see Paper 3: Figure 1 in the Appendix), grouping different identified routinization activities together (differentiating the internal and external model) based on their contribution to the three dimensions of absorptive capacity: identification, assimilation, and exploitation.

Longitudinal case study

In order to investigate the structure of work organization in creative crowdwork arrangements building on the practice perspective (Nicolini, 2012; Whittington, 2003), which was the main goal of Study 4, I explored how work is organized and conducted on a platform that mediates crowdwork (Spreitzer et al., 2017) and relies heavily on flexibility.

Given my interest in how work is organized in creative crowdwork arrangements, I used a case study approach that allowed me to gain a comprehensive and profound viewpoint of this emerging phenomenon (Eisenhardt, 1989; Walsham, 1995). According to Eisenhardt (1989), the case study approach is useful if "*little is known about a phenomenon, current perspectives seem inadequate because they have little empirical substantiation, or they conflict with each other or common sense*" (p. 548). Thus, because crowdworking is still in the early stages of development and organizing platform-mediated work is still unexplored, especially when it comes to more complex creative work, the case study approach is well-suited for the current study. This study was accomplished on the Topcoder platform, which is a well-

known, successful creative crowdwork platform and partners with important agencies, crowdsourcing ecosystem corporations, and consultancies across the world, such as TC3[2] and Appirio.[3]

As mentioned before (in Study 2), there are approximately 100 companies and enterprises, such as Google, IBM, and NASA, that rely on Topcoder for access to workers with hard-to-find skills.[4] Topcoder features online software design competitions (such as idea generation, application and web design, concept and icon design), software development competitions (such as Bug Bash, which is a challenge for fixing bugs in specified software products, and First to Finish, which involves rapid software development, quality assurance with a focus on testing software products, and a user interface [UI] prototype for front-end development), data science competitions (such as data visualization and data science ideation), and competitive programming events (based on the Topcoder website and Archak, 2010).

Data Collection

To explore how work is organized in creative crowdwork arrangements, I was interested in studying the dynamics among workers, platform owners, and job providers that make the three dimensions of flexibility possible. Data were collected from February to September 2018 through 42 semi-structured and open-ended Skype interviews. I conducted interviews with the workers, Topcoder staff, and job providers. Each interview was 40 and 50 minutes long. Additional data were gathered from the Topcoder Slack community channel utilized by staff and workers, the Topcoder website, and its forums.

The interviews with workers concentrated on two groups: experts (involving co-pilots and reviewers) and competitors (see Paper 4: Table A.5 in the Appendix), who were from different countries (i.e., Chile, Indonesia, Greece, India). In addition, I did interviews with platform staff and used secondary data in the form of short interviews with platform staff provided on the Topcoder website. The staff had different roles on the platform (e.g., project manager, community manager, creative director, product designer). I also did interviews with a few job providers. Finally, I observed and studied the communications and interactions among workers, staff, and job providers on different public Slack channels and Topcoder forums.

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[2] TC3 is a Japanese company with a focus on the Japanese market. TC3 teams are knowledgeable about crowdsourcing and open innovations.

[3] Appirio is an American company with a focus on the design and development of next-generation worker and client experiences using crowd, cloud, and solution accelerators.

[4] Information retrieved from https://www.topcoder.com.

The anonymity of job providers and workers on Topcoder posed some limitations in my data collection. I used LinkedIn to find prospective interviewees, because many workers list their specific contributions to Topcoder on their LinkedIn profiles. I continued the research, employed snowball sampling, and used prior interviewees' suggestions to reach out to crowdworkers with various genders and attitudes. Detailed information related to the interviewees is presented in Paper 4: Table 1 in the Appendix.

Data analysis

All interviews were recorded and transcribed. To ensure that nonverbal aspects were considered as well as verbal aspects, I took notes throughout the interviews. Field observation notes were made during observations of the interactions and communications among workers, staff, and job providers on public Slack channels and online forums. I performed iterative coding of observation notes, online data, and the interviews, mainly via open coding and then categorizing and modifying the codes built on both the theory and the data. I conducted coding for the three flexibility dimensions, as suggested by the data discovery and literature. I then concentrated on recognizing the practices that assisted in managing and strengthening the three flexibility dimensions, including professional socialization, career development, time management, budget management, task management, virtual communication, and workplace friendships, as shown in Paper 4: Table 2 in the Appendix. I assembled the codes based on the different dimensions of flexibility to distinguish the most efficient way of organizing the results. This process allowed me to discover and document the particular practices of the platform owners, workers, job providers, and the practices' interweaving.

Assessing rigor in information systems positivist qualitative case study research

I evaluated the rigor of my positivist qualitative case research against the criteria presented by Dubé and Paré (2003) and building on the substantial efforts of Benbasat et al. (1987), Eisenhardt (1989), Lee (1989a), and Yin (1994). The list of attributes includes the following three key areas.

First area: Research design

The research design includes the attributes related to the study design, including the kind of research questions, the criteria for selecting cases, and the theoretical foundations used. I identified clear research

questions as a whole and for each study separately; the questions for Study 2, Study 3, and Study 4 are "how" questions. Case study research is most suitable for "how" and "why" questions because these questions address operational connections that must be tracked across time, instead of simple incidence frequencies (Dubé & Paré, 2003; Yin, 2003). My thesis provided a prior construct specification and clear theoretical foundation for Studies 2, 3, and 4, which are exploratory case studies. Current theoretical structures lead to theory-building research and help to shape the initial design (Eisenhardt, 1989). A decision to use one or multiple cases in a study is one of the main issues in case study design. One of the key criticisms of case study research is related to its reliance on a single case, so that it cannot produce a generalizable outcome (Dubé & Paré, 2003). Thus, I used multiple case studies in my thesis to overcome this issue, including Topcoder, CanYa, and Pharma with the embedded cases of Upwork and Proteams.

I also provided an in-depth description of the research context, including where the research was performed and the particular period of time under examination; this helps to evaluate the findings' credibility and specify their generalizability (Dubé & Paré, 2003; Yin, 1994). I also reported to both of my supervisors and discussed the data collection process and analysis with them regularly to capture more vividness and nurture more confidence in the findings (Eisenhardt, 1989) and to increase the reliability of the findings. In fact, my supervisors were included in all data analysis processes.

Second area: Data collection

The second area, data collection, was the data-gathering process and its overall quality. It includes the selection of data collection methods and procedures, as well as the tactics for improving reliability and validity (Dubé & Paré, 2003). I provided detailed information regarding the data collection methods, which included interviews, direct observations, documents, white papers, websites, and online channels, for each study. I also provided detailed information on the procedures of collection, such as the number of interviews and interviewees, the duration of each interview, and whether the interviews were conducted by Skype or in person (see Papers 2, 3, and 4 in the Appendix). One research group has stated that "*a clear description of the data sources and the way they contribute to the findings of the research is an important aspect of the reliability and validity of the findings*" [in case research] (Benbasat et al., 1987, p. 381). Interestingly, I used triangulated data and combined multiple data sources, such as interviews, observations, online data, and forums, to improve the findings' internal validity. Any assumption or finding in a case study is considerably more truthful if it is based on multiple data sources (Dubé & Paré, 2003). Reliability aims to reduce the errors and biases in research (Dubé & Paré, 2003). Two specific strategies for guaranteeing reliability are the development of the case study database and the case protocol (Dubé & Paré, 2003; Yin, 1994). Thus, I provided a case protocol, which included the overall rules and procedures

that should be considered in doing data collection before starting this phase (Yin,1994), and I also discussed the protocol with my supervisors regularly during the data collection process. I provided a case study database that was shared with both of my supervisors on Dropbox; it included interview transcripts, a coding scheme, coded data, memos, documents, and other analytic material. This helped as we discussed the data in our regular meetings.

Third area: Data analysis

The third area, data analysis, is related to the description of the process, the use of preliminary techniques such as raw data coding, and the use of major data analysis methods such as explanation building and empirical testing (Dubé & Paré, 2003). I described the procedures and analytic methods clearly for each study so that external observers could have enough pertinent information to see how evidence was derived from research questions and how inferences were made from it, and vice versa (Dubé & Paré, 2003). I used analysis techniques such as coding as a tool for reflecting on data and presented appropriate and adequate quotes. Thus, the external observers could provide an unbiased assessment of the virtues of the analysis (Dubé & Paré, 2003). In qualitative case study research, coding is a particularly beneficial tool for data reduction. Moreover, to clarify the logical connection between the codes and the theoretical model, providing a coding scheme in an appendix is useful (Dubé & Paré, 2003). I used a systematic form of coding presented by Eisenhardt (1989) and Miles and Huberman (1994) in my thesis as a way of preventing bias and validating analyses, thus, improving the validity and reliability. For example, I selected dimensions or categories and then tried to find within-group similarities in them and also intergroup differences. I used appropriate quotes in my research to show participants' voices in my thesis (Dubé & Paré, 2003).

IV.   Summary of Findings

In this chapter, I present an overview of the findings across the four studies and demonstrate how the overarching research question is addressed. The findings provide a comprehensive understanding of how to govern and organize creative crowdwork to add value for job providers in the following ways.

First, in Study1, I explored the governance of current crowdwork arrangements in terms of control and coordination mechanisms that might add value for job providers by providing a conceptual model of crowdwork platform governance. Second, in Study 2, I identified the governance mechanisms of the

established and emerging creative crowdwork arrangements, focusing on platform governance under centralized and decentralized modes. I also presented 10 dimensions that provide a systematic differentiation among creative crowdwork arrangements based on the degree of centralization of the governance. Third, in Study 3, I identified how creative crowdwork arrangements through two successful crowdworking routinization models, internal and external, within the organizational work structure add value for them. Six propositions show how these two models contribute to absorptive capacity in different ways to add more value for organizations. Finally, in Study 4, I explored the structure of work organization in creative crowdwork platforms under three dimensions of flexibility through combined practices of workers, platform owners, and job providers that add value for all of the stakeholders, especially job providers. Moreover, I explored the social construction of psychological safety as an outcome of the combined practices that motivate both workers and job providers to take a risk and use this kind of platform, and I showed how psychological safety provides a feeling of trust for all parties and improves the platform's sustainability.

1.   Crowdwork governance mechanisms and value creation for job providers

In Study 1 I explored the mechanisms of current crowdwork platform governance as well as the relationships among organizational value creation and the identified mechanisms. Based on a thorough review of the existing literature on governance and crowdwork, I built a comprehensive conceptual model of crowdwork platform governance (see Figure1). The crowdwork platform governance effectiveness is the fundamental construct of the conceptual model; this implies the extent to which the coordination and control of platform functions and resources contribute to attaining the desired outcomes (see Paper 1: Table 2 in the Appendix for the descriptions of the constructs). The conceptual model components include: (1) the coordination and control mechanisms (i.e., processes) that help to understand crowdwork platform governance (2) the drivers (i.e., independent variables) that drive the two identified mechanisms; and (3) the crowdwork platform governance value propositions (i.e., outcomes), which refer to the value provided to job providers. Furthermore, the model postulates two significant moderating effects: (1) the degree of centralization of governance effect on the relationship between crowdwork platform governance effectiveness and governance mechanisms; and (2) the degree of routinization of work effect on the relationship between the value propositions provided to job providers and governance effectiveness.
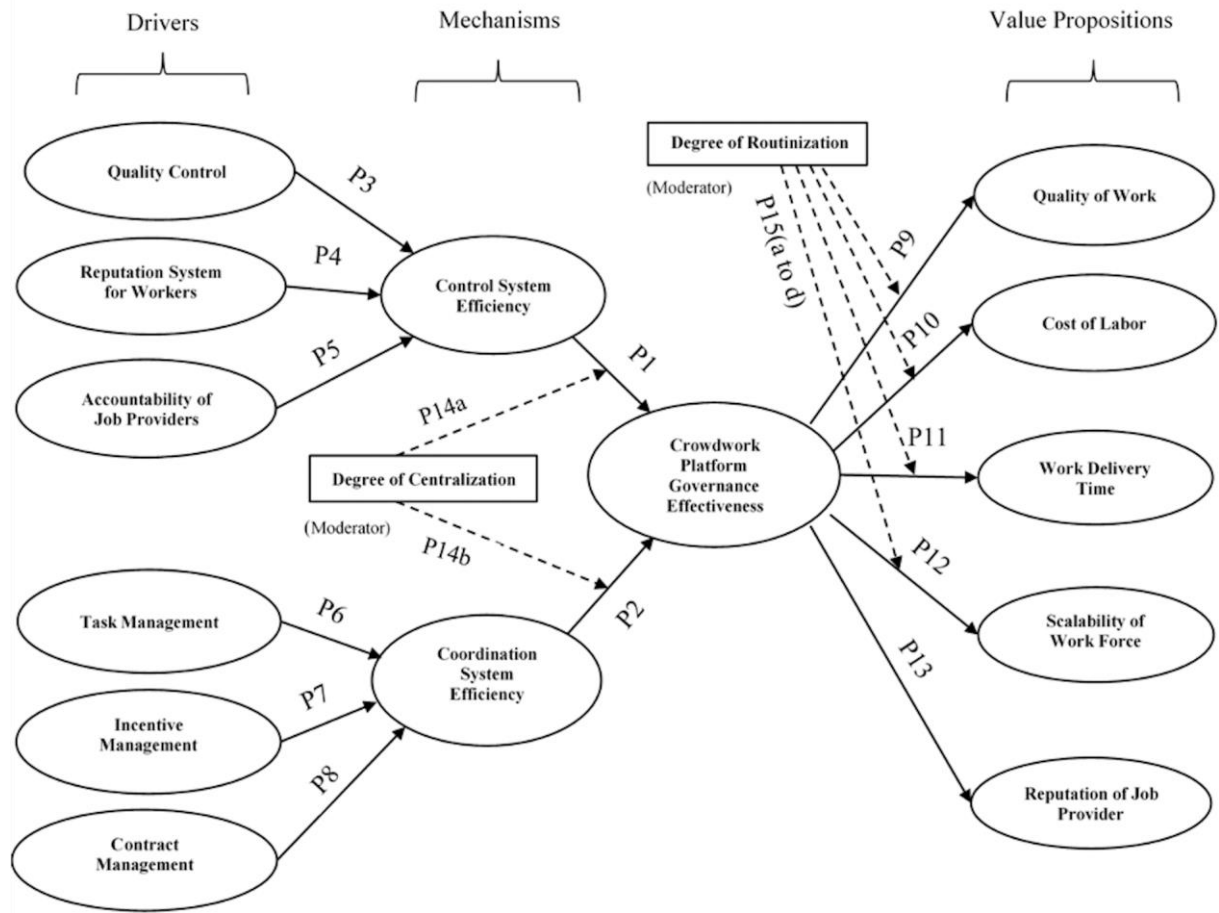
Figure 1: Conceptual model of crowdwork platform governance (Gol et al., 2019a)

Building on the literature, I suggest that for making crowdwork platform governance effective, there are two main mechanisms (i.e., processes): control system efficiency and coordination system efficiency (see Paper 1: Table 2 in the Appendix). For managing and running crowdwork platforms, the efficient joint operating of control and coordination systems is crucial. Directing and monitoring of the platform activities and process are accomplished by control, both formal and informal (Schreieck et al., 2016). In the meantime, the dependencies among crowdwork activities are managed by coordination (e.g., among job providers, crowdworkers and tasks) (based on Crowston, 1997; Kittur et al., 2013; Malone & Crowston, 1994).

The control system must validate job providers' and workers' conformity with platform standards and policies. The drivers of control system efficiency consist of: (1) Quality control that establishes output-oriented formal performance control; (2) reputation systems of workers that establishes informal social control; and (3) the accountability of job providers that establishes behavior-oriented formal administrative control (Eisenhardt, 1985; Kirsch, 1997).

41

The coordination system must manage the core activities of the platform. The drivers of coordination system efficiency are: (1) task management that coordinates the workflow, including different but interdependent work plans for each worker; (2) incentive management, that coordinates the incentives allotment utilized to encourage workers and support the interests of participants (Vakharia & Lease, 2015); and (3) contract management, that coordinates the creation of the agreement among job workers and providers regarding the work terms and conditions. Contract management is necessary for adjusting basis rules and forming actionable work plans that create the foundation for verifying conformity via the control system (Malone & Crowston, 1990).

Understanding the requirements for adding value from crowdwork is a significant strategic challenge for various businesses. In Study 1, I focused exclusively on the crowdwork value propositions for job providers (see Paper 1: Table A.3 in the Appendix) and examined how previous literature conceptualized the value propositions as well as their relationship to crowdwork platform governance.

2. Creative crowdwork governance under centralized and decentralized modes

In Study 2, I introduced an overview of the recognized governance mechanisms found in creative crowdwork arrangements with various degrees of centralization (see Table 1). To provide the basis for recognizing and classifying various governance elements, I utilized the notions of platform control, work control and work coordination. The platform control element appeared as a key distinctive characteristic between CanYa and Topcoder. This division of work governance and platform governance resonates with Gillespie (2017), who contended that governance *of* and governance *by* platforms are two aspects of platform governance. Governance *of* platforms implies the rules that direct platforms in their position as intermediaries (I refer to this in this study as platform control), and governance *by* platforms implies the ability of platforms to largely coordinate and control the workflow, moderate content, mediate among sides (I refer to this in this study as work coordination and work control). According to the literature and analysis of my data, I indicate that work control comprises the payment system, financial remuneration, reputation system for workers, and quality control. In contrast, work coordination comprises contract management, task interdependence management, task management, and dispute resolution management (see Table 1).

Specific governance elements offered compelling insights for comparison. For example, for comprehending decentralized governance, payment system, dispute resolution management, and contract management offer substantial insights. On the other hand, for comprehending centralized governance, task management and quality control are useful entry points. As anticipated, I found that in centralized

crowdwork platform governance, the platform owner plays a crucial role, and in decentralized platform governance, the members play a crucial role. In Table 1, I explain in more detail each of the mechanisms.

Table 1. Creative Crowdwork Platform Governance: Comparison of Topcoder and CanYa (Gol et al., 2019b)

Governance Mechanism		Topcoder	CanYa
Platform Control	*Platform management*	Corporate management and senior community members	Community managers of the open-source CanYa community (paid by CAN tokens)
	Platform development	Developers employed by Topcoder	Developers of the open-source CanYa community (paid by CAN tokens)
	Equity ownership	Shareholders (held by parent companies)	CAN token holders (held by the CanYa community members)
Work Control	*Remuneration*	Competition-based prizes and bonuses (only winners get paid)	Payment on delivery (or as negotiated in advance)
	Payment system	Brokered and intermediated by the platform	Direct payment via smart contracts (paid by CAN tokens)
	Quality control	Reviewer-based (prior to delivery; done by platform's appointed reviewers)	Not offered yet[5]
	Reputation system for workers	Seniority-based ranking	Stake-based ranking
Work Coordination	*Task management*	The platform provides an end-to-end, built-in management of the work process that is complemented by appointed project managers and co-pilots.	The platform provides only basic matching between job offers and workers.
	Task interdependence management	Managed by co-pilots	Not offered yet
	Contract management	Standard contract between platform and job providers, but no contract between platform and workers	Platform-generated smart contracts between job provider and workers
	Dispute resolution management	Arbitration by platform-appointed agent	Arbitration by platform-appointed third-party community member

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[5] "Not offered yet" describes governance elements that CanYa does not currently provide but plans to offer in the future.

In Table 2, I underline ten dimensions that provide a systematic distinction among creative crowdwork platforms based on the degree of governance centralization. Building on this study, I indicate that, by disseminating ownership, responsibilities, and decision-making rights amongst community members in decentralized governance, fairness, democracy, self-determination, and accountability can be improved (based on Azfar et al., 2001; Brown & Grant, 2005). As demonstrated in Table 2, in a decentralized crowdwork platform, ownership, and management focus on group consent and community. In contrast, in a centralized crowdwork platform, ownership and management are focused on top-down corporate decisions driven by the interests of the shareholder. In both cases, governance of the platforms is performed based on the platform owner's interests. However, ownership is centralized in the possession of one company such as Topcoder or decentralized among a community such as CanYa token holders.

Table 2. Creative Crowdwork Platforms: Juxtaposing Centralized and Decentralized Governance (Gol et al., 2019b)

Governance Dimensions	Centralized Platform	Decentralized Platform
Ownership	Shareholder	Community members
Management	Corporate management	Community leadership
Control	Top-down	Bilateral peer-to-peer
Work culture	Competition	Collaboration
Work agreements	Brokered	Direct (via smart contracts)
Transaction management	Intermediated	Direct (via smart contracts)
Transaction cost	High	Low
Platform service orientation	Full service	Self-service
Platform service range	Mature full portfolio	Emergent lean portfolio
Economic model	Transaction cost economics	Tokenomics

Given the platform owner's dominant position in the governance *of* the platform, it might not be shocking that the owner still directs the governance accomplished *by* the platform (i.e., how worker' and job provider' behaviors are controlled and coordinated *by* the platform). Within centralized governance, a high degree of control is focused in the hands of a few co-pilots and project managers, who monitor and supervise the progress of many workers (Brown & Grant, 2005). This strict control over the process generally leads to

superior control over the submission's quality. Conversely, control, in decentralized governance, is dispersed amongst community members; this obscures the capability to monitor all processes since much of the monitoring is performed in a peer-to-peer way. However, this may decrease power misuse.

Whether a community or a corporation, the platform owner's significant role also translates into different forms of transaction management and cultures of working in the platforms. For example, the culture in Topcoder is competition-based, with just one winner per project (Gol et al., 2018), but in CanYa, the culture of work is based on cooperation among members. As an intermediary, the platform owner plays a crucial role in facilitating activities such as dispute resolution, contract management, and task management in centralized platforms (based on King, 1983). Such facilitation services are left to the job providers and workers themselves in decentralized platforms. Moreover, smart contracts create work agreements on decentralized platforms, allowing workers and job providers to discuss their prices, job details, and working requirements or, generally, to have conversations about the job without intervention by a third party (Atzori, 2015). When a smart contract is ready, transaction management is done by following the software-coded contract (Atzori, 2015). Therefore, the transaction cost is far higher in centralized governance due to the intermediary services than in decentralized governance.

Notwithstanding the potential disadvantages of centralized crowdwork platforms, these platforms are more mature than decentralized ones since their economic model is built on the cost-economics of transactions, where the nature of transactions affects the contracts and the distribution of economic functions between markets and platforms (Williamson, 2008). This offers a robust economic model for centralized platforms and permits them to create value-adding services for the job providers and the workers. Conversely, the economic model in decentralized crowdwork platforms is tokenomics. All members in the ecosystem are motivated to engage in this model and earn economic benefits based on their stakes (CanYa Services Pty, Ltd., 2018a; CanYa Services Pty, Ltd., 2018b). This economic model's long-term sustainability is unclear, but limited monetization opportunities may impede the expansion of value-adding services on such platforms.

3. Crowdworking routinization as a driver of absorptive capacity in organizations

Two successful models of crowdwork routinization in organizations are identified in Study 3: internal and external models. They contribute to absorptive capacity in different ways. The internal model (Figure 2) contributes to absorptive capacity through the routinization of a centralized communication structure and mediated access to the pool of workers, facilitated project management activities, and informal crowdworking improvement activities. I present three propositions as follows:

P1a: *The internal model of crowdworking routinization enhances identification through a centralized communication structure that relies on mediated access to a pool of workers.*

P2a: *The internal model of crowdworking routinization enhances assimilation through facilitated project management activities.*

P3a: *The internal model of crowdworking routinization enhances exploitation through informal crowdworking improvement activities.*
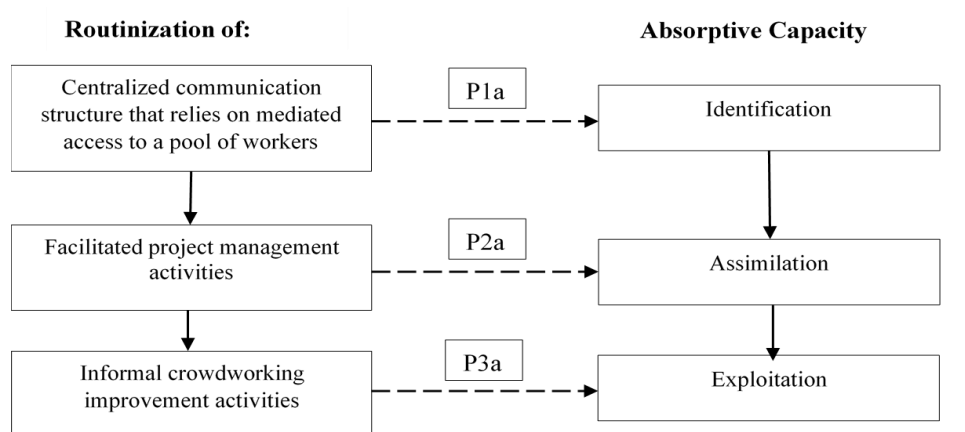
Figure 2: Internal model of crowdworking routinization (Gol et al., 2020)

Conversely, the external model (Figure 3) contributes to absorptive capacity through the routinization of a decentralized communication structure and direct access to the pool of workers, self-service project management activities, and formal crowdworking improvement activities. I present three propositions as follows:
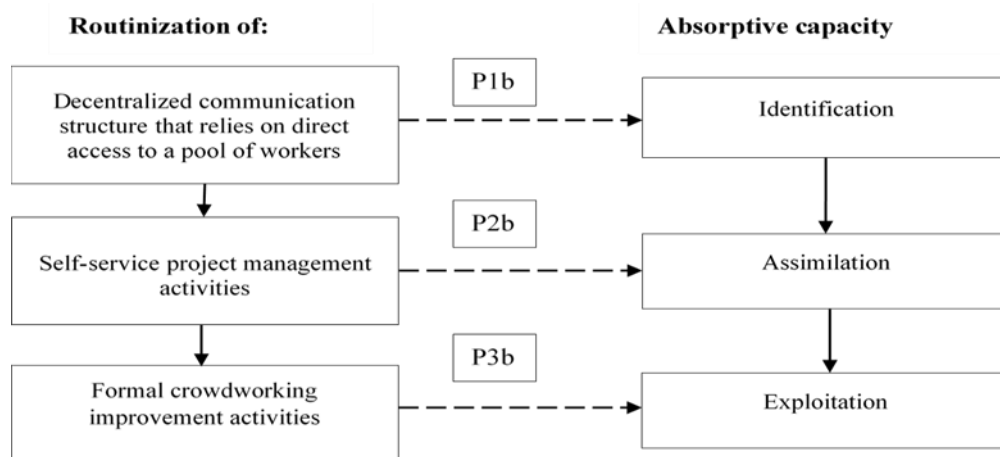
Figure 3: External model of crowdworking routinization (Gol et al., 2020)

P1b: *The external model of crowdworking routinization enhances identification through a decentralized communication structure that relies on direct access to a pool of workers.*

P2b: *The external model of crowdworking routinization enhances assimilation through employee self-service activities.*

P3b: *The external model of crowdworking routinization enhances exploitation through formal crowdworking improvement activities.*

I explored how the routinization of creative crowdworking can bolster the organizational absorptive capacity. In the internal model, communication, access to the pool of workers, and project management activities are performed by project managers, who play an intermediary role between Pharma employees and crowdworkers. Thus, the internal model is largely about the routinization of facilitation activities. Conversely, in the external model, communication, access to the pool of workers, and project management activities are performed directly by the employees. Thus, the external model is largely about the routinization of self-service activities. The internal model is well suited for projects with a high degree of confidentiality because they require access to Pharma's internal systems, whereas the external model is well suited for projects with a low degree of confidentiality (the two models are compared in paper 3: Table A.3 in the Appendix).

Importantly, I found that both models of crowdworking routinization can enhance the organizational absorptive capacity. The internal model enhances the identification of crowdworkers' knowledge by

reducing the costs and risks associated with identifying and assessing new external knowledge sources; essentially, these tasks are entrusted to a partner (platform project manager), and routines are put into place to ensure they do what is best for Pharma. The external model enhances the identification of crowdworkers' knowledge by increasing the flexibility of identifying and assessing new external knowledge sources; here, these tasks are entrusted to Pharma employees, and routines are put into place to ensure a smooth process and fewer overhead costs. The internal model enhances assimilation by aiding Pharma to comprehend new external knowledge through facilitation by project managers (they summarize the key takeaways for Pharma employees). Meanwhile, the external model enhances assimilation by aiding the combination of existing knowledge with new external knowledge by sharing ideas between employees and crowdworkers directly and providing direct feedback from employees to crowdworkers. Finally, both the internal and external models enhance exploitation by creating a feeling of safety among Pharma employees, and this encourages the use and implementation of new external knowledge. The internal model creates this feeling of safety through cultivating an informal, loyalty-oriented relationship with the crowdwork platform (Proteams), and the external model creates this feeling of safety through cultivating a formal, reliability-oriented relationship with the crowdwork platform (Upwork).

4. Structure of work organization on creative crowdwork

The key practices involved in shaping and managing flexibility in the employment relationship, scheduling, and location of work in the creative crowdwork arrangements explored through Study 4 are based on the case of Topcoder. The findings describe the key practices that organize employment relationship flexibility (professional socialization and career development); the key practices that organize scheduling flexibility (time, budget, and task management); and the key practices that organize location flexibility (virtual communication and cultivating work friendships). Remarkably, the findings reveal that despite the normal risks included in the gig and crowdwork arrangements for both job providers and workers, these practices together can produce psychological safety for everyone participating (Figure 4) (Gol et al., 2018).
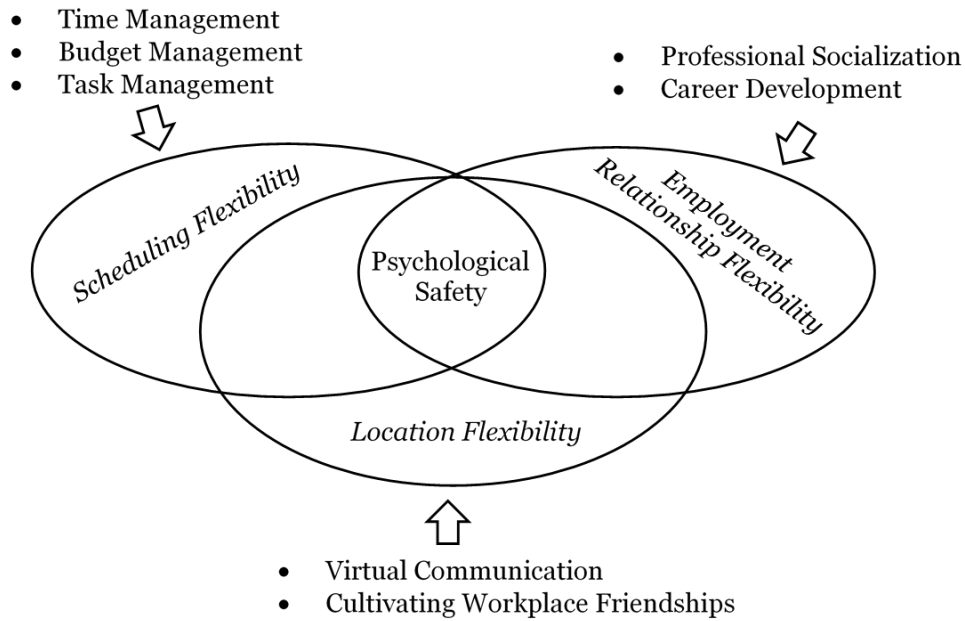
Figure 4: Work organization for psychological safety under three dimensions of flexibility (Gol, 2020)

Flexibility in an employment relationship refers to the temporary contract between an employee and a job provider. Flexibility in an employment relationship plays a key role in the business model of crowdworking platforms that are virtual brokers between highly skilled freelancers and interested job providers. On many crowdwork platforms (e.g., AMT and Upwork), workers report feeling marginalized and powerless because they lack an official employment status (Deng et al., 2016). Interestingly, I found that most of the workers on Topcoder were satisfied with being self-employed (Gol et al., 2018).

I found that a considerable number of workers on Topcoder left traditional jobs and became contract workers because they preferred a more flexible work arrangement, as portrayed by the following statements: *"Want to be free? Join Topcoder"* [P16]; *"I work as a freelance programmer and have the luxury of choosing which jobs I take. I usually pick those that I find interesting"* [P11]. This led me to investigate further how flexibility in an employment relationship is formed and managed in practice. I found that the key practices that form flexibility in the employment relationship on Topcoder are professional socialization and career development.

The scheduling of work flexibility refers to the control that workers have over their working times and the scheduling of work. Flexibility in scheduling and control over the workload are among the key benefits of gig working (Zheng et al., 2011). Abandoning the traditional 9-to-5 workday model on crowdwork platforms (Nansen et al., 2010) makes crowdworkers feel satisfied because it increases their sense of autonomy (Gol et al., 2018). I found that a substantial number of workers on Topcoder were pleased to have control over their work time, as highlighted by the following statements: *"I'm my manager. I have*

control over my time. I am able to choose working in the day or the night or during vacations" [P7]; *"These were the times when I spent most of my free time with programming competitions. It may sound weird, I admit, a guy spends 8 hours of work with computers and does the same during commuting and also in his leisure time*" [P11].

Although it is known that flexibility in scheduling can increase the satisfaction of workers, it is unclear how this flexibility is managed and shaped to prevent burnout and fatigue. This led me to investigate further how flexibility in scheduling is formed and managed in practice. I found that on Topcoder, it is accomplished through a combined practices of *time management, budget management, and task management.* Together, these practices balance the values and norms of flexible scheduling (Halpern, 2005) with the clarity and predictability that come from the scheduling of traditional work.

Flexibility in the location of work refers to the control that workers have over their working place. The ability to decide where to work is another key benefit of gig working that increases worker satisfaction by enhancing their sense of autonomy, as well as reducing work stress (Gol et al., 2018; Spreitzer et al., 2017). I found that a considerable number of workers on Topcoder were satisfied with doing remote work, as highlighted by the following statements: "*I do my work at my home while I'm in a playroom with my children*" [P20]; another emphasized, "*I like Topcoder as I can choose where I want to work from. I don't have to be in the office*" [P3]. This led me to investigate further how flexibility in the location of work is formed and managed in practice. I found that the key practices that organize flexibility in the location of work on Topcoder are virtual communication as well as cultivating workplace friendships.

Psychological safety (Edmondson, 1999) refers to the "*individuals' perceptions of the consequences of taking interpersonal risks in their work environment*" (Kark & Carmeli, 2009, p. 787). Once workers feel psychologically safe, despite the small chance of winning a competition on Topcoder, they have the ability to employ and reveal themselves without worry for adverse effects on self-image, status, or profession (Gol et al., 2018; Kahn, 1990). As shown in Figure 2, psychological safety as an outcome is conceived by combining the three main stakeholders' practices. For instance, professional socialization and cultivating work friendships, bolstered by the practices of virtual communication and the corresponding architecture, provide workers with professional and individual education opportunities. The engagement of the job providers and platform owner in most of the interactions brings all three stakeholders closer together. It confirms joint responsibility for the work projects' fruitful completion and the successful preservation of the spirit of Topcoder. As described by one worker, *"We have many practices regarding how to help each of our team members grow, as continuous improvement is one of our core values. I believe growth can happen when there is psychological safety for each team member to admit their weaknesses and mistakes*

without fear of being laughed at or judged. We achieve it through trust, transparency, and regular constructive feedback" [P9].

In addition, time management, budget management, and task management interweave with virtual communication and career development to achieve a sophisticated work organization that relies on the platform owner, job providers, and workers and is inherently designed to provide workers with growth and development opportunities. For example, the close collaboration between co-pilots and project managers, as well as the consultation process between co-pilots, project managers, and job providers, ensures that the questions of workers are answered, the requirements of job providers are taken into consideration, and the ability of Topcoder to deliver results on the project is guaranteed.

The combined practices of time, budget, and task management not only improve psychological safety among workers but also increase it in job providers, as one company employee articulated: *"This is actually the first project that we've worked with Topcoder, but I have to say it's probably one of the best projects that I have worked on as far as process is concerned. This platform allowed us to actually build a product and work in a process that was five times faster than it would have been if we had done this internally. We had a big innovative idea, but we had to find a way to make it happen that didn't take a decade. So, Topcoder was a great means to that end because we could engage these groups to help us build parts of this thing in a faster, more efficient way"* [P40]. Therefore, regardless of a possible lack of financial compensation, psychological safety provides workers with the intrinsic incentive to continue providing their services through the crowdworking platform (Gol et al., 2018). Notably, it also encourages job providers to take the risk of utilizing the crowdwork platform. Furthermore, regardless of the recognized issues with trust under the three dimensions of flexibility, the work organization that produces psychological safety also creates a trust feeling in the work process for all parties.

Building on the four empirical studies, the next section synthesizes the insights from the findings to answer the overall research question: *How is creative crowdwork governed and organized to add value for job providers?*

5.   Synthesis: Three creative crowdwork arrangements

Building on the findings across the four studies, I suggest that there are three ways that creative crowdwork can be governed and organized to add value for job providers. Hence, in this section, three arrangements are presented that emerged from the four studies that explored several rich case studies of creative crowdwork. The first one presents a platform-centric arrangement driven by a full-service crowdwork

platform (Arrangement 1), the second one presents an actor-centric arrangement driven by a barebones crowdwork ecosystem (Arrangement 2), and the third one presents an organization-centric arrangement driven by crowdwork integration and routinization practices (Arrangement 3). The three creative crowdwork arrangements are portrayed in Figure 5 and described below.
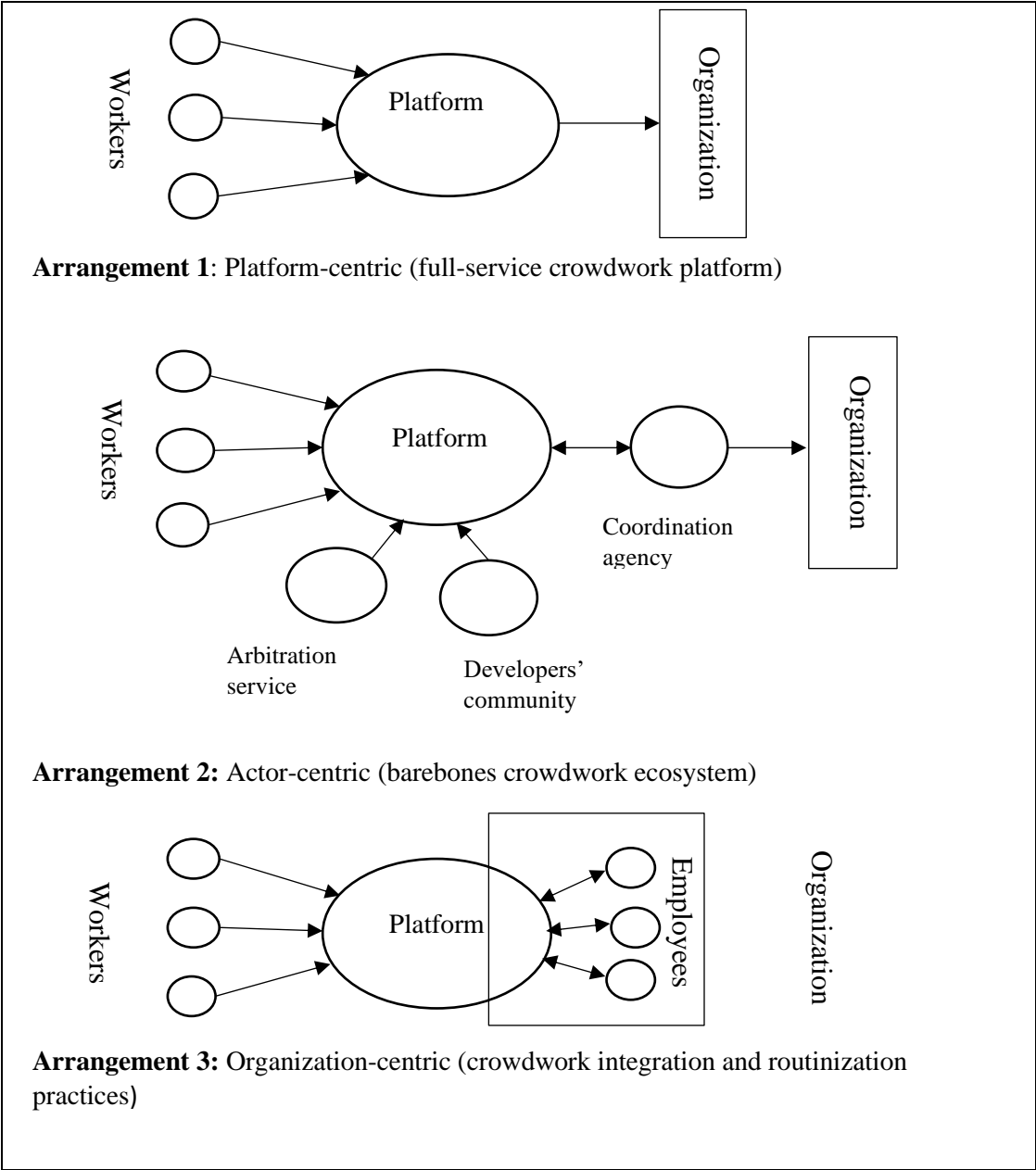
Figure 5: Three value-adding creative crowdwork arrangements

Arrangement 1: Platform-centric (full-service crowdwork platform)

In this arrangement, which is derived from Studies 1 and 2, the platform plays a vital role in governing and organizing creative crowdwork. Both the governance *of* the platform (i.e., the rules that guide the platform in its role as intermediary) and the governance *by* the platform (i.e., the platform's capacity to moderate content, mediate between parties, and control and coordinate the workflow) (Gillespie, 2017) are centralized. The platform is responsible for making different rules and standards that both workers and job providers must follow. It involves centralized governance in which the platforms' employees (e.g., project managers) are responsible for the control and coordination of work among job providers and crowdworkers, such as task management, contract management, quality control, and incentive management. This arrangement is often competition based, where the platform is responsible for running competitions among crowdworkers in multiple rounds to deliver the best submissions to the job providers. These competitions include many iterations of interaction and feedback between workers and the platform's staff that lead to an increase in knowledge for both parties from each project that is run. The relationship among crowdworkers and job providers is indirect and mediated through the platform owner. A successful illustrative case for this arrangement is Topcoder, which has existed since the year 2000. Future research is needed to investigate the success of this arrangement for creative crowdwork platforms with a different business model (e.g., matchmaking) and see whether and how platform-centric arrangements with different business models can govern and organize complex projects and add value to job provider organizations.

Arrangement 2: Actor-centric (barebones crowdwork ecosystem)

This arrangement is also derived from Studies 1 and 2 and refers to a governance and work organization where the platform, developers, workers, and job providers and coordination agencies (as facilitators between organizations and the creative crowdwork platform) are collectively responsible for the governance and organizing of creative crowdwork. This arrangement could be facilitated by blockchain technology so that governance of platforms and governance by platforms are decentralized and distributed among all actors. In this arrangement, all actors can be part of the system's governance and infrastructure; this allows them to make different rules and set different standards by getting a stake on the platform. Various levels of stakes include different abilities and responsibilities, and the participants are compensated for performing platform management duties (CanYa Services Pty, Ltd., 2018a). For example, open-source community developers can develop the platform following the platform style guide (CanYa Services Pty, Ltd., 2018a). All the rules are negotiated, and ad-hoc decisions are made by members.

Blockchain or other distributed technology solutions allow many forms of work control and coordination, such as payments (Zhang & Van Der Schaar, 2012), contract management, and remuneration, to be conducted through smart contracts without human intervention, reducing overhead and making the diminished role of the platform a possibility. Dispute resolution between workers and job providers can be done through an arbitration service, which involves actors with a higher stake in the ecosystem. Other work control and coordination activities, such as finding a worker whose skills match an organization's requirements, managing tasks and the interdependencies between tasks, and providing quality control (Vakharia & Lease, 2015), may be conducted by coordination agencies. These are mediators between job provider organizations and the platform that provide facilitation services in return for getting a stake in the platform. Because all actors in the ecosystem are involved in the governing and organizing of crowdwork in this arrangement, an increase in learning is expected among all parties. This arrangement is often based on matchmaking, and the relationship between crowdworkers and job providers may be either direct, through one-time smart contracts, or mediated, through coordination agencies. The illustrative case for this arrangement is the CanYa ecosystem, which has existed since 2015 and does not currently include a coordination agency. Future research is needed to investigate the success of this arrangement when it includes more actors (including coordination agencies) and depends on different business models (e.g., competition-based platforms).

Arrangement 3: Organization-centric (crowdworking integration practices)

In this arrangement, which is derived from Studies 3 and 4, the job provider organization plays a vital role in governing and organizing creative crowdwork through the routinization of crowdworking within its work structure. The governance of the platform is conducted through the platform and organizations collaboratively. For instance, in terms of the governance of platforms, the platform and organizations are responsible for making different rules and standards specific to their partnership that must be followed by both crowdworkers and the job provider organization's employees (e.g., Non-disclosure agreement (NDA) and General Data Protection Regulation (GDPR)). In sum, the governance of platforms is done collaboratively and is tailored to job provider needs. The governance by the platform can be centralized if the organization applies the internal crowdworking model or decentralized if the organization applies the external crowdworking model described in Study 3. In the centralized mode, the platforms' employees (e.g., project managers) are responsible for controlling and coordinating the work between the organization's employees and the crowdworkers, including finding the best workers, managing tasks, managing contracts, performing quality control, and managing incentives. In the decentralized mode, the organizations' employees are responsible for the control and coordination of the work themselves. The organization-centric arrangement includes many interactions and much feedback between crowdworkers,

the platform's staff, and the job provider organization's employees. This leads to an increase in knowledge for all three parties during each project and specifically increases the absorptive capacity of the organization. This arrangement can be based in both competition and matchmaking. The relationship between crowdworkers and the job provider organization may be both indirect (mediated via the platform owner in the internal crowdworking routinization model) or direct (in the external crowdworking routinization model) (Gol et al., 2020). The organization engages with, governs, and organizes the crowdworking continuously in this arrangement. Pharma has been successful in this regard and is an illustrative case for this model. It has used both internal and external crowdworking routinization modes from 2018 onward in collaboration with two creative crowdwork platforms: Upwork and Proteams. Future research is needed to examine the success of this arrangement as a job provider organization increases the number of creative crowdwork platforms it partners with.

Juxtaposing the three arrangements

The three arrangements are juxtaposed in Table 3 using the following dimensions: governance of platform, governance by platform, worker's relationship with job provider, business model, and learning benefits. The governance of the platform determines which actors control the platform. In Arrangement 1, the crowdworking platform owners are in control, as in any centralized arrangement. In Arrangement 2, the governance of the platform is distributed among all the actors who have a stake in the ecosystem (including workers), as in any decentralized arrangement. In Arrangement 3, it is the job provider organizations and the platform that are collaboratively in control of the platform.

The governance by the platform determines how "the work" is coordinated and controlled. In Arrangement 1, the platform owner is totally responsible for the governance by the platform (full-service). In Arrangement 2, the governance is distributed among workers, platform developers, and coordination agencies. In Arrangement 3, the way in which work is coordinated and controlled depends on the organization's crowdworking routinization model, whether internal or external, so the governance by the platform can be done totally by the platform owner (full-service) or conducted through a collaboration between the organization's employees and the platform owner.

Table 3. Juxtaposing the Three Creative Crowdwork Arrangements

Dimensions	Arrangement 1	Arrangement 2	Arrangement 3
Governance of platform (platform control)	By platform owner, *centralized*	Distributed among all stakeholders: workers, platform developers (open-source community), coordination agencies, *decentralized*	By platform owner and organizational coordination unit, *collaborative*
Governance by platform (work coordination and control managed by the platform)	Full-service, *centralized*	Distributed among all stakeholders, *decentralized*	Full service by platform owner in the internal crowdwork routinization model *(centralized)*, and self-service by organization's employees in external crowdwork routinization model *(decentralized)*
Worker's relationship with job provider	Indirect communication Mediated contract	Direct communication One-time smart contract	Direct/indirect communication Direct/mediated contract
Business model	Competition	Matchmaking	Competition and matchmaking
Learning benefits	Platform's employees and workers	All parties (in the ecosystem)	All parties
Illustrative case	Topcoder (2001 onward)	CanYa (2015 onward)	Pharma (2018 onward)
Related studies	Studies 1 and 2	Studies 1 and 2	Studies 3 and 4

The relationship between workers and job providers refers to the communication structure (Cohen & Levinthal, 1990) and form of contract management (Gol et al., 2019a). In Arrangement 1, the communication structure is indirect, and the contract management is mediated via the platform owner. In Arrangement 2, the communication structure is either direct, relying on smart contracts between workers and job providers, or indirect, relying on coordination agencies who have a stake in the platform. In

Arrangement 3, the communication structure and the contract management can be direct or indirect, depending on whether the organization adopts the internal or external crowdworking routinization model.

The business model determines the way that work is done on the platform (Gol et al., 2019b). In Arrangement 1, it is often competition based; there are a few winners per project and the platform governs and organizes the various rounds of the competition (Gol et al., 2018). In Arrangement 2, it is often based on matchmaking; the job providers seek the workers who best meet their requirements (Gol et al., 2019b). In Arrangement 3, both competition- and matchmaking-based business models can be present, depending on the kind of platform(s) with which the job provider organization chooses to collaborate.

A key benefit of crowdworking for all stakeholders is the learning acquired and the ability to absorb new knowledge from the experience. The three arrangements improve learning in different ways. In Arrangement 1, it is mainly the knowledge of the platform's employees and the crowdworkers that is increased. The job provider organizations receive the products of work but often learn little from the experience itself. However, in Arrangements 2 and 3, the knowledge of all parties is increased within the ecosystem. In these arrangements, the job provider organizations are also involved in the process of receiving the products of work. It happens through many interactions and much feedback (e.g., during quality control and task management activities) with the coordination agencies in Arrangement 2, and with the platform project managers as well as the crowdworkers in Arrangement 3. From a practical perspective, Arrangement 1 is useful for one-off, highly complex projects, whilst Arrangement 2 is suitable for one-off projects of medium complexity and especially for small- to medium-sized companies managing a low number of projects. Arrangement 3 is beneficial particularly for large companies with vast numbers of ongoing projects of medium to high complexity.

The three arrangements demonstrate how the crowdworking industry has changed through the years. The first arrangement is the most well-known and exemplifies the beginning of crowdwork. In recent years, a shift toward the second and third arrangements has been increasingly visible. Interestingly, each arrangement is a different form of the idea of crowdworking and the progression denotes a power shift from platforms to job provider organizations over time. Future research is needed to explore how relationships are changing in this industry and how the notion of crowdwork is changing with them. Crowdwork started as gig work that was useful for one-time routine projects that needed to be accomplished cheaply or as a form of problem solving or that was useful for one-time complex projects that benefitted from the wisdom of the crowd. Increasingly, it has now become an ongoing activity of an organization, essential for learning and innovation. That is a big change in how we perceive and understand crowdwork.

V. Contributions of Thesis

In this chapter, I outline the main theoretical contributions of my dissertation and discuss the implications for practitioners, job providers, and platform owners.

1. Contribution to theory

My thesis presents a comprehensive theoretical grounding for explaining and examining the value that creative crowdwork arrangements can deliver to job providers. First, it contributes to the conceptualization of crowdwork governance by elaborating on the mechanisms of control and coordination. Furthermore, it highlights the roles of the degree of centralization of platform governance as well as the degree of routinization of work as key moderators of the effectiveness of crowdwork platform governance and its influence on the benefit for job providers. Second, my thesis provides insights on the structure of work organization in creative crowdwork arrangements and the benefit of psychological safety in creating a sustainable crowdwork arrangement. Based on the four studies, I synthesize three distinct creative crowdwork arrangements, of which the actor-centric arrangement and the organization-centric arrangement have not been previously considered, and in which not only platforms but also job providers and workers play a critical role in governing and organizing crowdwork. Overall, my thesis contributes to the understanding of the crowdwork value for job providers by offering new theoretical visions that lead to the understanding of further value propositions for job providers with the focus on absorptive capacity.

Contribution to crowdwork governance and work organization

My thesis contributes to the crowdwork phenomenon through its conceptualization of current crowdwork platform governance, including the identification of established and emerging mechanisms of crowdwork platform governance under centralized and decentralized modes. It also contributes to creative crowdwork work organization by discussing psychological safety as an interesting outcome of the combination of the workers', platform owners', and job providers' practices.

Extending the conceptualization of crowdwork platform governance

My thesis contributes to a better theorization of the crowdwork governance phenomenon by recognizing control and coordination as two critical mechanisms in crowdwork platform governance (see Study 1: Figure 1). As emphasized earlier, most of the previous research studies have deliberated governance challenges in crowdwork platforms. However, their governance definitions have been expansive, with a few systematic examinations into governance (Nickerson et al., 2017). Although control is usually revealed in the literature of crowd and platform governance (Tiwana et al., 2010), coordination is hardly mentioned. Most existing literature of crowdwork refers to the umbrella term of "management" instead (Deng et al., 2016). Furthermore, what "management" refers to remains unclear. Therefore, my thesis makes progress by elucidating the importance and meaning of coordination mechanisms in crowdwork platform governance. Though control is vital in all types of governance, my research suggests that coordination is particularly important in crowdwork as managing dependencies is crucial when work is short-term, done on a substantial scale, dispersed, and mediated. Coordination is likewise of specific significance where crowdwork platform governance is decentralized, as clarified below.

Because centralized governance suffers from power inequalities and power abuse in terms of corrective action and verification, control is expected to have a more significant positive effect on the effectiveness of crowdwork platform governance (Azfar et al., 2001; Zyskind et al., 2015). In comparison, coordination is expected to have a more significant positive effect on the effectiveness of decentralized crowdwork platform governance because dependencies management suffers from disturbance, breakdowns of process, disconnects, and arduous demands on decision making which is based on group consent (Whiting et al., 2016). This also emphasizes that while with emerging technologies such as blockchain, the promise of decentralized platform architecture is becoming tangible (Tate et al., 2017), governance issues, especially those related to coordination, are likely to rise shortly. Hence, if the future of crowdwork is decentralized, the key to guaranteeing its achievement and strategic value for job providers will be coordination (and the contract, incentive, and task management that drive it).

Boosting the productivity and scalability of highly qualified workers via better governance will strengthen diverse organizational abilities from a strategic perspective (Teece et al., 1997). This implies the ability to (1) regulate the production ability of workers on the go to meet the demand fluctuation of the marketplace (Lepak & Snell, 1999), (2) conduct pilots on novelty ventures without interrupting the work of the permanent employees or on emerging innovation that needs ad hoc skills that are beyond the reach of the company (Kittur et al., 2013), and (3) reach out to the "wisdom of the crowds" (Majchrzak & Malhotra, 2013). For expanding generative capacity and organizational agility, these three operational enhancements are well-known to drive strategic value.

The conceptual model allows us to theorize what could be the future of crowdwork. Crowdwork is expected to develop beyond the existing centralized governance arrangements, grounded on development in technology and society, as well as preliminary knowledge learned from crowdwork arrangements recorded in the literature (Gaikwad et al., 2015; Scholz, 2016; Tate et al., 2017) and will also grow to be appropriate for progressively more creative and complicated tasks (Schörpf et al., 2017). Crowdwork has, in recent years, extended into citizen journalism, design of the motor vehicle, copy-editing of text, and related work involving creativity and technical skills beyond micro-tasks. However, these changes are also critical to contemplate in governance. As the conceptual model illustrates, the degree of work routinization impacts the relationship between the effectiveness of crowdwork platform governance and the value produced by crowdwork. In particular, the moderating effect of the degree of work routinization emphasizes that successful crowdwork platform governance is especially important to the overall creation of value in non-routine work.

It is anticipated that effective control and coordination would positively affect the quality of work, better work delivery time, and decrease costs further on creative crowdwork platforms. Therefore, as job providers gradually migrate to crowdwork arrangements for more creative and complex tasks, effective crowdwork platform governance is expected to become increasingly relevant. The long-term sustainability of routine crowdwork platforms is also in doubt because these platforms suffer from high turnover, unequal working conditions, and poor reputations (Deng et al., 2016; Kittur et al., 2013). These challenges could be addressed via better governance.

Differentiating between centralized and decentralized creative crowdwork platforms governance

By studying Topcoder and CanYa as two instances of creative crowdwork platforms with varying degrees of governance centralization, my thesis examined centralized and decentralized crowdwork platform governance. The findings shed deeper theoretical insights into the crowdwork platform governance by defining platform control, work coordination, and work control, integrating the governance *of* and governance *by* platforms ideas (Gillespie, 2017; Gol et al., 2019a). The identified mechanisms enable us to differentiate between crowdwork platforms in centralized and decentralized governance modes. The generated insights concerning such differences are described in Table 2 (Study 2).

Furthermore, my thesis highlights ten dimensions that enable a systematic distinction between centralized and decentralized modes of governance. It indicates that justice, democracy, accountability, and autonomy can be enhanced by the diffusion of ownership, decision-making rights, and responsibilities among members of the community in decentralized governance. To sum up, in a decentralized crowdwork

platform, management and ownership are focused on collective and group approval. Simultaneously, they are focused on top-down corporate decisions driven by shareholder concerns in a centralized crowdwork platform. In both cases, governance *of* the platforms is performed consistent with the concerns of the platform owner; though, the ownership can be centralized in one company's hands (e.g., Topcoder) or decentralized within a community. In both governance *of* the platforms and governance performed *by* the platforms, these models of ownership translate into substantial differences.

Identifying work organization in creative crowd work arrangements

My thesis contributes to creative crowdwork work organization by examining psychological safety as an interesting potential outcome of the combination of the workers', platform owners', and job providers' practices. The recognized practices for effectively organizing employment flexibility comprise professional socialization as well as career development; for effectively organizing scheduling flexibility include time, budget, and task management; and for effectively organizing location flexibility include virtual communication, as well as cultivating work friendships. The social construction of psychological safety can be achieved through the three parties' combined practices (see Study 4: Figure 2). Psychological safety provides workers with an intrinsic motivation to continue delivering their services through the crowdworking platform regardless of the possible lack of financial compensation (Gol et al., 2018). It also encourages job providers to accept the inherent risks in utilizing crowdwork platforms. Regardless of the recognized challenges to trust generated by the three dimensions of flexibility, psychological safety can create a feeling of trust among all parties in the work process.

Identifying two novel creative crowdwork arrangements

My thesis contributes to creative crowdwork governance and work organization by introducing two novel creative crowdwork arrangements: the actor-centric arrangement, driven by a barebones crowdwork ecosystem, and the organization-centric arrangement, driven by crowdwork integration and routinization practices at job provider organizations. In the actor-centric arrangement, all actors, including the platform owner, workers, and job providers (potentially via coordination agencies), are responsible for governing and organizing creative crowdwork. This arrangement can be facilitated by blockchain technology, and all actors in the ecosystems are part of the system governance and infrastructure in making rules and standards through getting a stake on the platform. Thus, the arrangement eliminates the structures of hierarchical power and, consequently, can reduce the abuse of power (Azfar et al., 2001; Zyskind et al., 2015). Different

stakes levels are associated with various responsibilities and abilities, and the actors are remunerated for accomplishing corresponding platform management duties. Thus, this arrangement improves fairness, autonomy, democracy, and accountability by dispensing rights of decision-making and obligations and therefore expands the involvement, ownership, and responsibility of all actors (based on Azfar et al., 2001; Brown & Grant, 2005). Moreover, the coordination agencies in this arrangement, which take over the task of interacting with the crowdworkers, reduce the burden of negotiating different terms and conditions, as well as budget and time constraints, quality control, and task management, which are critical for job providers. Thus, this arrangement would reduce the financial and security risks for job providers of having projects completed on crowdworking platforms (cf. Brown & Potoski, 2003).

The organization-centric arrangement demonstrates how job provider organizations and crowdwork platforms govern and organize creative crowdwork in collaboration with each other through two different routinization models: the internal model of crowdworking routinization and the external model of crowdworking routinization. In the internal model, which demonstrates the routinization of facilitation activities, creative crowdwork is governed through a centralized communication structure, facilitated project management activities, and informal crowdworking improvement activities. In this model, most of the activities are performed by project managers who play an intermediary role between the organization's employees and crowdworkers. In contrast, in the external model, which demonstrates the routinization of self-service activities, creative crowdwork is governed through a decentralized communication structure, self-service project management activities, and formal crowdworking improvement activities. In this model, most of the activities are performed by the organization's employees. The organization-centric arrangement is well suited for projects with high confidentiality that can be accomplished through the internal model and for projects with low confidentiality that can be accomplished through the external model.

Notably, both models of crowdworking routinization in this arrangement can enhance organizational absorptive capacity. The internal model enhances the identification of crowdworkers' knowledge by decreasing the costs and risks related to identifying and evaluating new external knowledge sources, and the external model enhances the identification of crowdworkers' knowledge by increasing the flexibility of identifying and evaluating new external knowledge sources. The internal model enhances assimilation by helping the organization to realize new external knowledge through the platform project manager's facilitation. Meanwhile, the external model enhances assimilation by helping the merging of existing knowledge with new external knowledge through the direct sharing of ideas and feedback between employees and crowdworkers. Finally, both the internal and external models enhance exploitation by generating a feeling of safety among the organization's employees, which fosters the utilization and implementation of new external knowledge. The internal model creates a sense of safety by cultivating an

informal, loyalty-oriented relationship with the crowdwork platform, whereas the external model creates a sense of safety by cultivating a formal, reliability-oriented relationship with the crowdwork platform.

Contribution to understanding crowdwork value for job providers

My thesis contributes to understanding the value of crowdwork for job providers with the focus on absorptive capacity and shows how crowdwork has shifted from providing access to cheap, on-demand labor to providing key innovation benefits through the identification, assimilation, and exploitation of new external tacit knowledge of crowdworkers within organizations.

Identifying the contribution of crowdworking routinization to absorptive capacity

My thesis contributes to a better theoretical understanding of the value of creative crowdworking for job providers by theorizing how the routinization or crowdworking in large organizations increases their absorptive capacity. Understanding the internal and external models of crowdworking routinization and their contribution to organizational absorptive capacity has two important implications: (1) It extends the fundamental conceptualization of crowdwork and its potential benefits, and (2) it helps theorize crowdworking as a new form of open inbound innovation for organizations that contributes to their absorptive capacity by bringing in new tacit and explicit knowledge. These implications will next be considered from a theoretical perspective.

Crowdworking as a routine extension of the workforce

The routinization of crowdworking in a large organization paves the way for a fundamental shift in the conceptualization of crowdwork. A key implication of crowdworking routinization in an organization is the legitimation and institutionalization of crowdwork as an established form of work, rather than a one-off staffing solution. Accordingly, ancillary workers are increasingly becoming part of the organizational workforce (Mattarelli et al., 2018). As highlighted by the findings, there are different models of routinizing crowdwork in organizations with different implications for the workforce: a more centralized model relies on having some of the crowdworkers and project managers internally in-house, and a more decentralized model relies on employee-driven, grassroots initiatives. The centralized model with some internal, in-house crowdworkers fosters a close personal relationship between the organization's employees and the

crowdworkers, creating loyalty and replicating many traditional collegial dynamics that arise from sharing the same physical space (Capdevila, 2015). Here, talented crowdworkers are brought physically into the organization and get hired for projects by virtue of being inside the organization. Conversely, the decentralized model, with all crowdworkers located externally on platforms, fosters a more formal relationship between the organization's employees and the crowdworkers, creating reliability and networking dynamics that arise from word-of-mouth advocacy and recommendations (Mahajan et al., 1984). Here, talented crowdworkers get hired for projects again and again until they become an established extension of the organization's permanent workforce.

Bolstering absorptive capacity: Crowdworking as a new form of open innovation

Another key implication is the revelation that crowdworking, when successfully routinized in an organization, can contribute to its absorptive capacity. That is, it contributes to the organization's ability to identify, assimilate, and exploit new external knowledge (Ahn et al., 2016; Cohen & Levinthal, 1990). It is argued in my thesis that crowdworking is a new way for organizations to engage with inbound open innovation (Chiu et al., 2014) given its positive effect on the identification, assimilation, and exploitation of knowledge, both explicit and tacit, that is shared by the crowdworkers as they become part of the organization's workforce. The two different routinization models incorporate the crowdworkers into the organization in different ways and draw on their talents in different ways. The internal model provides mediated access to knowledge and opportunities that are internalized through facilitated project activities and used through informal improvement activities to generate incremental innovation and value. In contrast, the external model provides direct access to knowledge and opportunities that are internalized through self-driven project activities and used through formal improvement activities to generate incremental innovations and value (Table 4). As a result, the routinization of crowdworking as an inbound open innovation contributes to absorptive capacity through different mechanisms in the internal and external models.

Table 4: Crowdwork Routinization Models and Their Contribution to Absorptive Capacity (Gol et al., 2020)

Absorptive Capacity	Aim	Internal Model	External Model
Identification	Accessing knowledge and opportunities in the environment through…	Mediated access	Direct access
Assimilation	Comprehending and internalizing knowledge into work practices through…	Facilitated activities	Self-service activities
Exploitation	Using the acquired knowledge for improvement activities that generate value through…	Informal unstructured procedures	Formal structured procedures

The complementary relationship between the internal and external models in support of creativity and innovation

It has been established that innovation requires activities that support both divergent and convergent thinking (Secundo et al., 2019). Throughout the crowdworking routinization models, divergent and convergent thinking can be continuously fostered, leading to the discovery of various directions via divergent thinking and refocusing on certain directions to follow via convergent thinking. Table 4 shows how the internal and external models are complementary in support of innovation. Divergent processes are supported by the external model through identification and assimilation and by the internal model through exploitation. In contrast, convergent processes are supported by the internal model through identification and assimilation and by the external model through exploitation. This cross-functional relationship underscores how the internal and external models complement one another and how both are desirable for a fully enhanced effect of crowdworking on the absorptive capacity of organizations (Gregory et al., 2015).

2. Contribution to practice

Four metaphors that can guide both scientific and practical thinking about the potential added value of crowdwork are summarized in a two-dimensional framework in Table 5.

Table 5: Future of Value-Adding Crowdwork (Gol et al., 2019b)

	Routine Work	Creative Work
Centralized crowdwork platform governance	Digital sweatshop	Talent factory
Decentralized crowdwork platform governance	Day-labor marketplace	Talent marketplace

Extant crowdwork platforms defined by centralized governance are best described by the metaphors of a digital sweatshop (Pittman & Sheehan, 2016) or a talent factory, depending on their focus on either routine or creative work. The digital sweatshop implies crowdwork sites such as AMT, which work on reducing costs and earnings with little concern for workers' conditions of work or the resources given to job providers to get value from crowdwork (e.g., there is a lack of quality control). This operating assumption focuses on outsourcing basic jobs to inexpensive, low-skilled workers with limited alternative jobs.

On the other hand, the talent factory implies crowdwork platforms concerned with more complex and creative jobs (e.g., Topcoder, Upwork). The word talent refers to value and the necessity for fostering, and thus the metaphor of talent factory highlights the Tayloristic and functional approach toward organizing work (Donini et al., 2017). The metaphor of the talent factory highlights the platform capabilities to provide the right people with the proper skills, on-demand (Hewitt, 2009; Ready & Conger, 2007).

In comparison to these metaphors, my research indicates that forthcoming crowdwork platforms, which will be progressively described by decentralized governance, would arouse the metaphors of the talent and day-labor marketplaces. While routine and creative crowdwork differences still apply, both metaphors indicate a change in power; both high- and low-skilled workers have more control over clients' preferences to whom they can sell their talents at a market price in these scenarios (Lee, 2014).

These four metaphors give platform owners and job providers a valuable beginning point for strategically thinking about the design of the platform and organization of work. To create initial types of crowdwork, centrally governed platforms functioned as steppingstones. The advent of decentralized governance opens the horizon for the crowdwork platforms transformation into a more inclusive and profitable work ecosystem.

My research also reveals that platforms with centralized governance are more mature than platforms with decentralized governance, since their economic model is focused on transaction cost economics where the transactions nature affects the contracts and the distribution of economic functions between the markets

and the platform (Williamson, 2008). This offers a deep-rooted economic model for centralized platforms as a foundation and enables them to invest in producing value-adding services for job providers and workers. Conversely, tokenomics is the economic model in the platforms with decentralized governance. All the ecosystem users are motivated in this model to participate and earn financial profits consistent with their stakes. The sustainability of tokenomics is uncertain, but limited possibilities of monetization may prevent the expansion of value-adding services on such platforms. I hope that my research can guide scientists and practitioners, particularly platform owners, to attract more job providers and workers and, most importantly, to retain desirability in workers and job providers' eyes to ensure sustained performance in the market.

My thesis guides organizations in the design and routinization of successful creative crowdwork platforms to nurture their absorptive capacity and inbound open innovation potential. The management of projects is challenging on crowdworking platforms due to the many work processes involved (Gol et al., 2019; Thuan, 2015). My thesis is a guide for organizations in understanding how to manage the ongoing crowdwork projects in a centralized (facilitated) or decentralized (self-service) arrangement via the project–crowdwork model fit. Another practical implication of it is its concept of employment. The concept focuses on changing the notion of on-demand contract workers from cheap labor for hire (Kittur et al., 2013) to a core flexible workforce who contributes to absorptive capacity and assists full-time employees within organizations.

My thesis, through its internal and external crowdworking models and their different ways of contributing to absorptive capacity, provides a mindset by which organizations can shift from outsourcing (i.e., drawing on its suppliers) (Oshri et al., 2015) to crowdworking (i.e., drawing on individuals to conduct their projects). Using crowdworking not only has economic benefits for organizations; it also increases the transparency of the work process and provides flexibility in changing project requirements during the work process due to the co-creation of knowledge (Margaryan, 2016; Thuan et al., 2015) and close interactions between the organization's employees and crowdworkers. Moreover, doing continuous crowdworking provides companies with an opportunity to contribute to sustainable development and equity distribution (Cui et al., 2019) across the world. Jobs are available to people in less fortunate places, and this contributes to many having worthwhile work across the globe. My thesis can serve as a guide for practitioners in the development of a fruitful creative crowdwork platform by revealing the practices of organizing work for psychological safety under the three flexibility dimensions, and work (re)design recommendations (e.g., tasks, relationships, and infrastructure designs) can be derived from the identified practices.

VI.   Limitations, Challenges, and Future Research

Although my thesis contributes to research and practice, it also inevitably has certain limitations. In this chapter, I explain the limitations that readers should reflect upon when applying the findings in practice, and I show how these limitations open up new horizons for future research.

First, since the phenomenon of crowdwork is in its early stages, with associated practices still developing and socio-technical processes being flexible (Nickerson, 2014), operating crowdwork platforms with decentralized governance are rare, and a mature and strong case of a such platform does not exist. Consequently, to investigate established and emerging creative crowdwork arrangements under centralized and decentralized modes in the second study, I conducted a comparative case study between a mature and a start-up platform with different business models (competition vs. matchmaking). I investigated the key dimensions of governance (e.g., direct work contracts vs. brokered) comparable for each platform (see Table 2). However, some characteristics of governance, such as competition-based work culture, are associated with the related business model and are not sensible for both competition and matchmaking platforms. Therefore, future research is required to investigate different creative crowdwork arrangements with the same business model and a similar level of maturity. Furthermore, a more detailed perspective is needed on how the decentralized characteristics of the platforms affect value generation and relationships within the ecosystem.

Second, one can argue that crowdwork routinization in large organizations, as investigated in Study 3, is currently applicable to only a few large organizations across the world. Consequently, finding organizations that are using continuous crowdworking in their routine work systems is difficult. Hence, I focused on one large organization case that was conducting creative crowdworking on a large scale, and this gave me the ability to study two different units. However, the findings cannot be easily generalized to the routinization of all creative crowdwork platforms with different degrees of governance centralization, as well as different business models. I have paid particular attention to the routinization of centralized creative crowdwork platforms with a matchmaking business model. It remains a challenge to see whether and how more decentralized creative crowdwork platforms (e.g., CanYa) with different business models can be routinized within organizations. Future research should embark on comparative case studies on how more decentralized creative crowdwork platforms with different business models are routinized within an organizational work structure, in order to identify the similarities and variances between the routinization of centralized and decentralized creative crowdwork platforms and their contributions to the absorptive capacity of large organizations.

There is still a lack of knowledge on how to develop structures to support higher levels of innovation through crowdworking routinization with complex governance and work organization within large organizations (Anya, 2015; Mattarelli et al., 2018; Thuan et al., 2015). Therefore, I generated six propositions that explain how crowdworking enhances the absorptive capacity of organizations. Further research is required to examine these propositions in additional case organizations. The findings of Study 3 are based on data from one large case organization that utilizes creative crowdworking on a large scale. Naturally, data from additional organizations would have contributed to the validity and generalizability of the study. In addition, the findings are based on the case organization that was collaborating with two particular crowdworking platforms. It remains unclear how organizations can cope with a larger number of platforms and what would be the impact of more or different crowdworking platforms on the organization. Further research could investigate the impact of crowdworking routinization on the future of organizational employees' work life and work practices. Moreover, further research is required to investigate the impact of crowdworking routinization on organizational strategies, governance structures, and managerial systems.

Third, the anonymity of job providers and workers on Topcoder posed some constraints on the data collection for Study 4, which was about how work is organized on creative crowdwork platforms under three dimensions of flexibility. I used LinkedIn to find prospective interviewees who specify their contributions to Topcoder on their profiles. I continued my research, employed snowball sampling, and used suggestions of prior interviewees to reach out to workers with various genders and attitudes. However, a lack of time and resources prevented me from finding an adequate number of job providers to interview. Thus, another challenge is to investigate extensively the job provider's perspective in working with creative crowdwork platforms with the focus on psychological safety. Further research is required to investigate the effect of work organization within creative crowdwork arrangements on job providers. In addition, although in the fourth study I concentrated on explaining the organization of work on creative crowdwork platforms, I mostly focused on a competition-based platform and did not consider a matchmaking platform. Thus, future research is required to investigate work organization on creative crowdwork platforms with a matchmaking business model.

Fourth, one can argue that by building on the four empirical studies I could have investigated creative crowdwork governance in more breadth and depth than I did creative crowdwork organization. Because the three different creative crowdwork arrangements emerged from the synthesis of my four studies at the end of my thesis, there was not enough time to examine these arrangements in depth and from different perspectives as I was pursuing my Ph.D. Therefore, future investigation is necessary to examine these three different arrangements extensively. I discussed the different creative crowdwork arrangements but measuring the added value of each arrangement to job providers remains for further research. Thus, a future

study is necessary to examine to what extent each of the creative crowdwork arrangements adds value to job providers. A further study is also essential for investigating what types of value each of the creative arrangements adds to job providers (e.g., one arrangement can be oriented toward efficiency and the other one toward innovation). Future research is needed to understand the effect of these arrangements on creative crowdwork platforms' success and sustainability. Undoubtedly, the three different creative crowdwork arrangements open many topics for future research, such as the welfare of workers, scaling up beyond what is currently imaginable, the analysis of digital traces of crowdworking to better understand productivity, learning, task achievability, career significance, the variety of relationships in creative crowdwork arrangements, and so on.

Fifth, because crowdwork is a complex phenomenon that is growing fast, I applied a qualitative case study methodology (Paré, 2004; Yin, 2003) to explore and investigate crowdwork within its context using various data sources (Baxter, 2008). The case study approach usually mixes methods of data collection, such as observations, surveys, interviews, and documents (Yin, 2009). This triangulated methodology creates stronger evidence of assumptions and structures. The selection of data collection methods depends on limits in access, time, and economic resources. I opted for a mixture of interviews, documents, and observations, focusing on the first two. Thus, performing a survey remained a challenge because of the absence of proven indicators and concepts. I also used limited observations because of the problems in obtaining access to platform employees, crowdworkers, and job providers in Study 2 and Study 4, as well as constraints of time and resources in the organization in Study 3. In Study 3, I had restricted time available for data collection at Pharma, and thus, I performed interviews rather than broad observations to provide more efficient utilization of this time. Pharma employees were rather reluctant to let me observe their crowdworking process via their systems until they knew me well and could trust me. Undeniably, I had to start the data gathering before having fostered adequate trust to observe employees. Therefore, future research is required with more emphasis on surveying and observation to examine the crowdwork phenomenon and create stronger evidence of constructs and hypotheses that would increase the reliability and validity of the findings. Using various sources of information in a case study makes any finding and hypothesis much more persuasive and truthful (Dubé & Paré, 2003).

All in all, building on previous research of crowdwork platforms, this dissertation develops the governance construct, implications for work organization and crowdwork routinization in large organizations, discusses its significance and value to job providers, and delivers substantive instructions for future study in the form of a set of propositions in the first and third studies. Thus, future research is required to extend these theoretical works by assessing and operationalizing the proposed models.

VII. Conclusion

Crowdwork as a novel form of digitally mediated employment transforms work organization and the nature of value creation in a disruptive manner (Durward et al., 2016a; Kittur et al., 2013). In this thesis, I focused on creative crowdwork that involves professional and complex tasks and, thus, requires a considerably more complex governance and work structure than routine crowdwork. Even though crowdwork is developing fast and creating many opportunities for job providers (Durward et al., 2016b), generating value out of crowdwork for job providers is difficult because crowdwork is challenging to govern and organize (Deng et al., 2016; Spreitzer et al., 2017). Thus, in this dissertation, I addressed how creative crowdwork is governed and organized to add value for job providers.

My thesis project was designed with four studies to present a comprehensive understanding of the overarching research question and contribute to advancing our knowledge in theory and practice. First, Study 1 explored the governance of current crowdwork arrangements and their capacity to add value for job providers through a state-of-the-art review of theories and developments. It also investigated how crowdwork platform governance is conceptualized and practiced and how it contributes to organizational value creation. Second, Study 2 used a comparative case study to investigate the governance mechanisms of the established and emerging creative crowdwork arrangements with a focus on platform governance under centralized and decentralized modes. Third, Study 3 explored how creative crowdwork arrangements use two successful models, internal and external, of crowdworking routinization within the organizational work structure to contribute to absorptive capacity. This study was performed through a longitudinal embedded case study. Finally, Study 4 used a longitudinal case study to explore how structures of work organization in creative crowdwork arrangements are shaped and formed under three dimensions of flexibility across combined practices of platform owners, workers, and job providers. By building on the findings across the four studies, three creative crowdwork arrangements were identified that add value to job providers: (1) a platform-centric arrangement, in which the platform plays a major role in governing and organizing creative crowdwork; (2) an actor-centric arrangement, in which all actors (i.e., the platform owner, workers, and job providers) are responsible for governing and organizing creative crowdwork; and (3) an organization-centric arrangement, in which an organization and crowdwork platforms govern and organize creative crowdwork in collaboration through two different routinization models, the internal model of crowdworking routinization and the external model of crowdworking routinization.

My thesis presents a comprehensive theoretical and practical foundation for exploring and studying creative crowdwork arrangements. It contributes to the conceptualization of crowdwork platform governance via mechanisms of control and coordination. It also highlights the role of the degree of the routinization of work and the degree of the centralization of platform governance as crucial moderators of

the effectiveness of crowdwork platform governance and its effect on the benefit for job providers. My thesis contributes to an understanding of creative crowdwork arrangements by highlighting the differentiation between centralized and decentralized governance mechanisms of creative crowdwork. It also generates an in-depth understanding of centralized and decentralized crowdwork governance by applying the work coordination and work control ideas and investigating platform control as a critical differentiating characteristic between CanYa and Topcoder. My thesis highlights ten dimensions for a systematic distinction between centralized and decentralized creative crowdwork arrangements. It provides deep insights into the work organization structure in creative crowdwork arrangements by presenting the main practices for achieving and managing the flexibility of employment relationships, scheduling, and location.

Also, my thesis presents the social construction of psychological safety as an outcome of the combined practices of platform owners, workers, and job providers. It motivates job providers and workers to take risks and participate on these kinds of platforms and provides all parties with a feeling of trust, as well as improves the sustainability of the platform. Furthermore, it contributes to crowdwork value for job providers. It presents how creative crowdwork arrangements through crowdworking routinization within an organization's work structure contribute to absorptive capacity in terms of identification, assimilation, and exploitation via internal and external models. My thesis also presents how crowdworking becomes routinized within an organization, instead of being only an external platform economy phenomenon, through centralized or employee-driven arrangements. It also presents how an additional layer of an organization can manage ongoing projects that draw on talent offered on an on-demand basis. Moreover, my thesis presents crowdworking as a novel way to engage organizations with open inbound innovations beyond ideas and with talent that contributes to absorptive capacity.

My thesis guides organizations in the design and routinization of successful creative crowdwork platforms to nurture their absorptive capacity and potential for inbound open innovation. It guides organizations to understand how to manage ongoing crowdwork projects in centralized (facilitated) or decentralized (self-service) arrangements via the project–crowdwork model fit. My thesis can also guide practitioners to design a fruitful creative crowdwork arrangement by revealing the practices of organizing work for psychological safety under the three flexibility dimensions and how work (re)design recommendations (e.g., task, relationship, and infrastructure design) can be derived from the identified practices.

In conclusion, building on the review of theories and conceptual model developments, my thesis offered a more profound understanding of crowdwork governance that could be utilized to inform platform creators, employers, and politicians who have the potential to build a more impressive future of crowdwork for crowdworkers and job providers. I desire to show that one path for such a move is in rethinking our

assumptions regarding what crowdwork arrangements are and revisiting the platform's role and its design in crowdwork. Notably, in the field of low-skilled work, the platform can play a more standout role in the integration of labor than is desired; that is, it can direct and characterize the work utilizing Tayloristic hetero-direction (Donini et al., 2017). I recommended that in addressing these problems, we should go further than improving current designs of the platform (e.g., updating AMT) to contemplate completely new, alternative designs of the platform. In short, I am carefully confident about the future capability of crowdwork to provide flexible work arrangements, fair incomes, and inclusion for workers and to help companies hold labor costs in check and efficiently adapt to the ups and downs in labor demand. I also provided insight for organizations into transforming the work on their projects from traditional outsourcing to crowdworking. They can manage various ongoing creative projects through the crowdworking project model fit with a core flexible workforce (the crowd), who contributes to the absorptive capacity. This would provide more flexibility and work process transparency due to the co-creation and close interaction between the organizations' employees and crowdworkers. Last but not least, routinizing crowdworking would provide organizations with an opportunity to offer worthwhile work across the globe to people in less fortunate circumstances.

VIII.   References

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IX.   Appendix

1.   Research Paper 1

Crowdwork Platform Governance toward Organizational Value Creation

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Crowdwork Platform Governance toward Organizational Value Creation

Abstract

Crowdwork, a new form of digitally mediated employment and part of the so-called gig economy, has the capacity to change the nature of work organization and to provide strategic value to workers, job providers, and intermediary platform owners. However, because crowdwork is temporary, large-scale, distributed, and mediated, its governance remains a challenge that often casts a shadow over its strategic value. The objective of this paper is to shed light on the making of value-adding crowdwork arrangements. Specifically, the paper explores crowdwork platform governance mechanisms and the relationships between these mechanisms and organizational value creation. Building on a comprehensive review of the extant literature on governance and crowdwork, we construct an overarching conceptual model that integrates control system and coordination system as two complementary mechanisms that drive crowdwork platform governance effectiveness and the consequent job provider benefits. Furthermore, the model accentuates the role of the degree of centralization and the degree of routinization as critical moderators in crowdwork platform governance. Overall, the paper highlights the potential of crowdwork to contribute not only to inclusion, fair wages and flexible work arrangements for workers but also to organizations' value and competitive edge.

1. Introduction

Paid, online crowdwork[6] has emerged as a new model of digitally mediated employment. It encompasses all kinds of remunerated work organized via online labor platforms, which function as online marketplaces that enable job providers to look for workers and help job seekers to find work (Kittur et al., 2013). This paper sheds light on the mechanics of crowdwork platforms and theorizes on the relationship between crowdwork platform governance and organizational value.

Crowdwork is expected to contribute to innovation, strategic competitive advantage, and reduction of labor costs by giving organizations flexible access to a large pool of resourceful and (usually cheap) labor on a temporary basis. Platforms such as Amazon's Mechanical Turk (AMT) and Upwork play an essential role in crowdwork arrangements, facilitating the transactions and interactions between workers and job providers. For workers across the globe, crowdwork has the potential to unlock previously unthinkable career opportunities in online marketplaces (Marr, 2016). However, crowdwork can be a double-edged sword, as it can both enhance and diminish the quality of workers' lives (Deng et al., 2016). Furthermore, in terms of strategic value for job providers, the low cost of labor, with limited or no worker protections, may provide short-term benefits but may not be sustainable in the long term (Kittur et al., 2013). Nevertheless, crowdwork is disrupting the working arrangements that already endure major shifts in contemporary business organizations (Forman et al., 2014).

There are three key stakeholders in crowdwork: workers, organizations or individuals providing work (job providers or employers[7]) and intermediary platforms (online marketplaces). Getting value out of crowdwork is challenging for all three stakeholders for various reasons. Workers' high dropout rates due to low wages or unfair treatment, which have been studied extensively (Deng et al., 2016; Ma et al., 2016), threaten the long-term viability of the crowdwork industry. From a legal perspective, major

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[6] Crowdwork and crowdsourcing are often used interchangeably in the literature. We use the term crowdwork because we focus exclusively on *paid* labor, whereas crowdsourcing often relies on volunteers (e.g., in emergencies) (Liu, 2014). Moreover, in this paper, crowdwork only refers to work performed by workers external to the job provider's organization.

[7] Crowdworkers are self-proprietors (i.e., they are not employees in a legal sense). However, crowdworkers often still act like parties to an employment contract (Chen and Horton, 2016).

problems lie in categorizing the relationships between the job provider, platform and worker (Donini et al., 2017). From an organizational point of view, crowdwork comprises the changing of permanent jobs into a supple resource pool in which crowdworkers assume tasks in a project-based manner (Durward et al., 2016). There is a risk of losing knowledge and control over the crowd's activities, not just because the work is distributed and temporary, but also because of the intermediary platforms. Many of these challenges can be traced to how crowdwork platforms operate – temporary work arrangements, scalable and distributed workforce, and technology-mediated activities – which make crowdwork platform governance difficult. Platform governance consists of two aspects: governance of and governance by platforms (Gillespie, 2017). The first aspect refers to the rules that platforms need as an intermediary, while the second aspect refers to the platforms' ability to mediate between sides, moderate content, coordinate and control the workflow (Gillespie, 2017). This paper focuses on the latter, and thus we use the term *crowdwork platform governance* throughout the rest of this paper to denote the responsibility of platforms as mediators of temporary and distributed work arrangements between job providers and workers.

Governance is often mentioned in studies of crowdwork but remains poorly defined. In broad terms, crowdwork platform governance refers to various control and coordination systems, including work practices, standards and policies (Deng et al., 2016, p. 281) with regard to, for example, task design, feedback from clients or platforms, financial and/or social incentives, and quality management (Schörpf et al., 2017, p. 46). However, a review of the literature reveals a dearth of systematic studies of crowdwork platform governance mechanisms. Furthermore, the crowdwork phenomenon is in the infancy stage, with related practices still forming and socio-technical processes remaining flexible (Nickerson, 2014). Consequently, Information Systems (IS) scholars have an opportunity to contribute to understanding and designing the social and technical foundations of crowdwork.

Accordingly, this paper aims, first, to contribute to a better understanding of crowdwork platform governance and, subsequently, to address some of the most pressing challenges that job provider organizations face in attempting to extract value from crowdwork. Particularly, while extant research differentiates between creative and routine crowdwork (Buettner, 2015; Margaryan, 2016), it is unclear

whether and how routine and creative crowdwork are governed differently by platforms and how this may impact the value generation to job providers. Similarly, while research increasingly recognizes that governance by crowdwork platforms may be done in either a centralized or a decentralized manner (Atzori, 2015; Hein et al., 2016), it is unclear how different governance mechanisms function under centralized and decentralized crowdwork platform governance modes. Thus, for organizations making the decision to use crowdwork as part of their employment strategy, knowledge and choices regarding crowdwork platform governance are critical (Nickerson et al., 2017).

With this in mind, in the present review paper, we focus on understanding, revealing, and synthesizing the key constructs at play in the literature and theoretically reflecting on governance issues in crowdwork platforms by addressing the following research question: *What is the relationship between crowdwork platform governance mechanisms and organizational value creation?* To answer this overall question, we must also clarify what the crowdwork platform governance mechanisms are. We analyze the crowdwork literature to elicit how governance has been investigated and conceptualized. The paper focuses on crowdwork systems from the job provider's perspective, examining the opportunities and challenges for organizational value creation. We contribute to the domain of crowdwork by introducing a conceptual model of crowdwork platform governance that is also suitable for alternative, decentralized crowdwork arrangements and for both routine and creative crowdwork platforms. Practically, the suggested model provides a basis to specifying guidelines for crowdwork, enabling organizations to take advantage of the potentials of crowdwork while also establishing fair working conditions for individual crowdworkers (Durward et al., 2016).

2. Theoretical Foundations

This section lays the groundwork for the examination of crowdwork platform governance. It introduces crowdwork platforms as a specific case of multi-sided platforms and covers the conceptual foundations for the study of crowdwork platform governance.

2.1   Multi-sided Platforms

Crowdwork platforms may be considered an instance of multi-sided platforms (Schmidt, 2017), functioning as online markets that facilitate exchange among various types of stakeholders who are not otherwise able to transact with each other (Gawer, 2014). For example, Airbnb and eBay enable interactions between two or more separate sides through the platform (Hagiu and Wright, 2015). Upwork provides independent workers from around the world the ability to connect with and offer their services (e.g., programming skills) to job providers. The exchanges facilitated by the platform are usually one-off transactions.

Overall, the platform plays an intermediary role to coordinate the supply and demand aspects of a market (Schmidt, 2017). The platforms tend to move most of the expenses, risks and responsibilities to the other parties, and they usually only provide a virtual service such as an app or a website and do not support the labor cost or the production means (Schmidt, 2017). At the same time, the platforms uphold sole and privileged control over data, processes and rules on the platform. The services and tasks are coordinated via the platform but are not necessarily bound to a precise place and specific person. Thus, these kinds of platforms are often location-independent and support distributed actions as well as a high degree of scalability. These characteristics of multi-sided platforms – mediation between distributed sides, temporary arrangements, and scalability – are mirrored in the characteristics of crowdwork that is performed through platforms.

2.   2.2   Crowdwork

Crowdwork includes all types of paid work organized via online labor platforms (De Stefano, 2016; Donini et al., 2017). These platforms function as intermediaries between workers and job providers, facilitating the description, submission, acceptance and payment for the work accomplished (Irani, 2015a). AMT, Upwork, TopCoder, CrowdFlower, and Clickworker are some examples of crowdwork platforms (Margaryan, 2016).

The nature of tasks on crowdwork platforms can differ noticeably. Research distinguishes between microwork (i.e., more *routine* crowdwork) and online freelancing (i.e., more *creative* crowdwork) (De Stefano, 2016; Margaryan, 2016).[8] Microwork includes projects divided into microtasks that can be performed in seconds or minutes, are generally repetitive, and do not require a high level of skill (e.g., filling out surveys, tagging pictures) (De Stefano, 2016). Microtasks are defined as "stand-alone tasks" with a "clear definition" (Buettner, 2015, p. 4611). Amazon's Mechanical Turk (AMT) is the best-known example of a microwork or routine crowdwork platform.

In contrast, creativity fundamentally involves innovative performance (Woodman et al. 1993). Creative tasks include idea creation, competition, and evaluation that can be accomplished by the crowd (Buettner, 2015). As such, creative work often requires significantly more resources (e.g., skills and time) than routine work at individual, team, and organizational levels (Rimmer, 2016). Online freelancing is a good example of more creative crowdwork. In this case, job providers contract skilled services, such as graphic design and web development, to dispersed workers (Margaryan, 2016). Upwork (previously oDesk and Elance) is an example of an online freelancing or creative crowdwork platform (Margaryan, 2016).

Crowdwork platforms provide a governance structure that is necessary to address the challenges in managing a distributed and scalable workforce (Deng et al., 2016; Greengard, 2011) performing tasks that have traditionally been handled by small, dedicated groups in organizations (e.g., Deng et al., 2016; Kittur et al. 2013). Crowdwork platforms govern the work process (e.g., instruction, configuration, task assignment) to drive participation of workers and improve worker productivity (Deng et al., 2016). Both unclear task descriptions and complex interfaces can impact the quality of work negatively, because workers are uncertain of the correct procedures and expectations (Kittur et al., 2013). As task complexity increases, the governance of the work process can be expected to become more challenging.

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[8] The degree of routinization and the degree of creativity of work are two anchors on a continuum that characterize the complexity of work tasks and the consequent skill level required to accomplish it. However, in this paper, we make a dichotomous distinction between routine and creative crowdwork to coincide with the noticeable difference between the crowdwork platforms that focus on routine microtasks (e.g., AMT) and the platforms that focus on creative freelancing (e.g., TopCoder). Thus, we presume that routine crowdwork implies non-creative work, and similarly, that creative crowdwork implies non-routine work.

In sum, the factors that impact crowdwork success and the value generated for job providers are both platform- and work-related and are often difficult to separate. As online, paid crowdwork only exists and functions because it is performed via a platform, we contend that crowdwork governance is crowdwork platform governance. Specifically, it is the governance by platforms of temporary, scalable, distributed and mediated work arrangements between job providers and workers – as will be discussed in the next section.

2.3   *Crowdwork Platform Governance*

It is necessary for multi-sided platforms to attract, coordinate and control the respective parties participating in the platform (Schreieck et al., 2016). Crowdwork platforms, specifically, have been argued to provide general directive control through the standards, policies and rules that guide behavior on the platform (Deng et al., 2016; Manner et al., 2012) and allow the monitoring of workers' and job providers' performance and environment (Howcroft and Bergvall-Kåreborn, 2018). Furthermore, crowdwork platforms coordinate the interactions among job providers and workers (Howcroft and Bergvall-Kåreborn, 2018; Schmidt, 2017). Thus, crowdwork platform governance rests on two key aspects: *control* and *coordination*.

In multi-sided platforms, control includes the ways that the platform owner monitors and oversees the processes inside the platform (Schmidt, 2017). Having access to data on all interactions enables platform owners to have the power to affect the exchange among the parties (Schreieck et al., 2016). The well-known control strategies of formal and informal control (Eisenhardt, 1985) are utilized in crowdwork platforms through mechanisms such as quality control and reputation control (Schreieck et al., 2016). Formal control is performed via performance evaluation (Eisenhardt, 1985), with behavior and outcome evaluation being the two common modes of formal control. In behavior control, controllers monitor controlees' behaviors and reward them according to the degree to which they follow the procedures (Kirsch, 1997). In outcome control, controllers evaluate performance and grant rewards in relation to outcomes achieved, not procedures followed (Eisenhardt, 1985). Informal control, conversely, can be reached by minimizing the divergence of preferences between organizational members (Eisenhardt, 1985).

In this case, members collaborate in the accomplishment of organizational goals because they have internalized these goals. Internalization of goals may be achieved through a variety of informal control mechanisms such as affirmative human resource policies, training, team building, and socialization (Kirsch, 1997).

Coordination in crowdwork platforms includes mechanisms for attracting both job providers and workers (cf. Hagiu and Spulber, 2013) through managing dependencies between crowdwork activities (based on Crowston, 1997; Malone and Crowston, 1994; Kittur et al., 2013). While coordination refers to "the act of working together harmoniously" (Malone and Crowston, 1990, p. 5), in classic organizational research, coordination and control are often entangled and are not always easy to distinguish. For example, Mintzberg (1980) discusses five ways to facilitate coordination; however, some of these (direct supervision, outputs standardization and work process standardization) overlap with formal control mechanisms, while others (skills standardization) overlap with informal control mechanisms. Only one – mutual adjustment, in which workers coordinate their activities via informal communication with each other (Mintzberg, 1980) – truly functions as a coordination method. Coordination methods are selected to manage dependencies among tasks and resources that exist in the process (Crowston, 1997). For example, in crowdwork platforms, complex jobs require task decomposition into subtasks, where two or more workers may be working on the same task or consecutive tasks, setting limitations on their actions and demands on their interactions with each other (cf. Kittur et al., 2013). To solve these coordination problems, platforms must engage in additional activities not captured in formal and informal controls.

In the next section, we introduce the distinction between centralized and decentralized governance – a theoretically and practically significant factor to consider in crowdwork platform governance given the increased attention in the discourse to distributed architectures, such as peer-to-peer networks and blockchain technology, which rapidly gain traction across industries and provide an infrastructure for a new form of decentralized crowdwork platforms (Tate et al., 2017; Xu et al., 2016).

2.3.1   Centralized and Decentralized Crowdwork Platform Governance

The overwhelming majority of research on crowdwork and its governance assumes that crowdwork arrangements are, by design, limited to configurations of workers, employers and centralized intermediary platforms, such as AMT (Vakharia and Lease, 2015). However, recent research has highlighted that crowdwork as a concept could go beyond traditional centralized arrangements by drawing on ideas of cooperativism and worker-owned and -managed platforms (Gaikwad et al., 2015; Scholz, 2016).

Centralized and decentralized modes of crowdwork platform governance are likely to apply different control and coordination mechanisms in the platform, which subsequently may have different advantages and disadvantages (Hein et al., 2016). Centralized crowdwork platform governance is expected to enable smooth coordination of workflows on highly separate tasks through central guidance and direction (based on King, 1983[9]). There is a high level of control over work process and output standards (Brown and Grant, 2005), which enables control over work quality and crowdworker behavior through monitoring and assessment against standards (based on King, 1983). Centralized crowdwork platform governance is known to effectively keep performance in line with platform protocols and procedures (King, 1983). Thus, centralization has clear advantages.

However, centralization also has adverse side effects that stem from power concentration, such as dishonesty, discrimination, protection of status and misuse of power (Zyskind et al., 2015). In crowdwork platforms, a centralized governance means a lack of direct communication among workers and job providers, because all communications are mediated via the platform (Kittur et al., 2013). Thus, mutual adjustment among workers is hindered. Moreover, centralization of all decision-making (Brown and Grant, 2005) may lead to inefficiencies due to a lack of capacity and flexibility, which, in turn, may lead to insufficient responsiveness to challenges (Atzori, 2015). The high level of control exerted on participants

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[9] King (1983) discusses the organizational considerations of centralized and decentralized computing in general, *not* specifically as applied to crowdwork platform governance. We have adapted his arguments to the context of crowdwork platform governance.

during interactions and on the accessibility of workers to the platform also means there is often little transparency in governance processes (Hein et al., 2016).

In comparison, decentralization of governance removes hierarchical power structures in organizations and, therefore, can decrease the misuse of power (Azfar et al., 2001; Zyskind et al., 2015). Decentralized crowdwork platform governance can improve efficiency by removing decision-making bottlenecks; can improve fairness, democracy, self-determination, and accountability by distributing decision-making rights and responsibilities; and can increase participation, ownership and obligation by all participants (based on Azfar et al., 2001; Brown and Grant, 2005). When work is more complex, decentralized crowdwork platform governance is likely to allow for smoother coordination of workflows, as overlapping tasks and parallel working requires cooperation among workers, worker discretion and less central oversight (King, 1983). Moreover, decentralized arbitration systems within the platform can address conflicts via smart contracts, with rules agreed upon by the parties and matched with common law (Atzori, 2015). Furthermore, decentralized crowdwork platform governance provides an opportunity for direct communication among workers and between workers and job providers (based on Atzori, 2015).

At the same time, decentralization can, paradoxically, remove behaviors and institutions that are vital to high-quality work (Whiting et al., 2016). Decentralization poses serious control and coordination challenges and creates demands for laborious consensus-based decision making. In decentralized governance, each platform stakeholder may potentially require different sets of controls and standards (Brown and Grant, 2005). Decentralized crowdwork platform governance can be expensive, because it requires creating and maintaining means to cater for the various parties' opinions. Thus, there are substantial costs involved in applying well-developed decentralized plans (King, 1983). Incentives must be considered for managers, data processing experts, and members to pursue the creation of such a plan. As such incentives are not always readily available, a gradual development toward the decentralization of crowdwork platform governance may be appropriate (King, 1983). A summary of the differences between centralized and decentralized platform governance is presented in Table 1.

Table 6

Centralized Crowdwork Platform Governance vs. Decentralized Crowdwork Platform Governance

	Centralized Crowdwork Platform (CP) Governance	**Decentralized Crowdwork Platform (CP) Governance**
Workflow Coordination	Central guidance and direction provide smoother coordination of workflow in discrete tasks (King, 1983).	Worker discretion and distributed oversight provide smoother coordination of workflow in complex projects, where tasks overlap and parallel working and cooperation among workers are needed (King, 1983).
Communication	There is no direct communication between workers and job providers (all communication is mediated by the central platform) (Kittur et al., 2013).	There is an opportunity for direct communication among all platform participants (e.g., workers, job providers) (Atzori, 2015).
Decision Making	Decision making power is concentrated in the platform. The platform exercises a high level of control on whether and how workers and job providers can access the platform, and there is a lack of transparency in governance processes (Hein et al., 2016).	Decision making power is distributed among all stakeholders. The platform's control on workers and job providers is loosened, and the governance process is more transparent (Atzori, 2015; Hein et al., 2016; Zyskind et al., 2015).
Standardization	The same set of standards guide all stakeholders' behaviors on the platform (Brown and Grant, 2005).	Different customized standards may guide the behavior of different stakeholders (Brown and Grant, 2005).
Control Cost	Cost of control is reduced, as the same rules are applied to all parties (Bergvall-Kåreborn and Howcroft, 2014; King, 1983).	Cost of control is high, either because of efforts required to carry out control of various stakeholders with different interests and power or errors that happen due to no control (King, 1983).
Quality Control	The platform controls workers' submission adherence to platform standards through monitoring (King, 1983, p. 20).	Consensus-based evaluation of quality controls workers' submission adherence to collectively agreed-upon standards. Incentives for different parties to keep to these commitments are needed (King, 1983).
Performance Control	Algorithms keep performance in line with the platform's protocols and standards (King, 1983).	Workers' discretion, self-regulation and informal control keep performance in line with the prevailing standards (King, 1983, p. 3).

This concludes the groundwork for the literature review and conceptual model development. Above, we have clarified our approach to crowdwork platform governance. First, we considered crowdwork platforms as a specific case of multi-sided platforms. Second, we considered crowdwork

platform governance as a matter of control and coordination of platform resources and activities. These conceptual clarifications guided the literature review, as outlined below.

3. Methodology

Research on crowdwork is growing, and much of it has been conducted outside the Information Systems (IS) field. Due to the vastness of the crowdwork literature, we limited the initial sample of studies in the literature review to those in which both crowdwork platform and governance were central themes. Overall, we conducted a state-of-the-art theory development review that aimed to examine how crowdwork platform governance is conceptualized and practiced, as well as to explore potential theoretical extensions thereof. Accordingly, we used a *theoretical review* strategy (Paré et al., 2015) to analyze the literature in our search for themes and patterns with respect to crowdwork platform governance.

The review covers conceptual and empirical papers in journals and conferences, both within and outside the IS field, that reveal a diversity of patterns concerning how crowdwork platform governance is conceptualized and studied, as summarized in Appendix (Table A.1, A.2 and A.3). We used the data in the Appendix as the basis for a subsequent analysis to identify themes in crowdwork platform governance research as well as to reveal perceived gaps and directions for future research. Broadly, we followed the approach of Webster and Watson (2002) to develop literature-based concept matrices that render the thematic terrain. Next, we followed the approach of Rowe (2014) to develop a conceptual model that portrays the relationships among concepts.

3.1 Literature Search

In order to identify relevant literature for this study, we applied the recommendations of Webster and Watson (2002) and Rowe (2014). We used a comprehensive collection of scientific databases as the primary data source: EBSCO, Proquest, ACM DL, Scopus, Google Scholar, AISeL and IEEE Xplore. We searched for titles, keywords, abstracts, and full texts using the following combinations of search terms:

("crowdwork" OR "crowdsource" OR "crowdworker") AND "governance"; ("job provider" OR "job requester") AND "governance"; ("digital labor" OR "digital labor platform" OR "online digital market*" OR "Amazon Mechanical Turk") AND "governance". This procedure ensured that the initial sample of studies included only those articles in which both crowdwork and governance were important themes. We included AMT (with spelling variations) as a specific crowdwork platform, because this platform is the most frequently studied. Aiming for high-quality publications, we began by focusing on papers from the AIS Senior Scholars' Basket[10] and designated IS conferences. We then extended the search scope to adjoining disciplines, such as computer science, social sciences, economics and finance, and law, as well as IEEE and ACM conferences. Within those disciplines, we eliminated publications not considered research papers, such as editorials, interviews, commentaries, book reviews and keynotes.

Next, we selected a set of relevant research papers by going through each paper's abstract and skimming the entire content. We considered only papers on paid crowdsourcing and paid crowdwork, while we excluded papers on unpaid crowdsourcing. Moreover, we only kept papers that explicated crowdwork platform governance in some detail, excluding papers that only mentioned the term "governance" but did not examine the phenomenon. Because the worker perspective heavily dominates the crowdwork literature, we made a choice to only focus on highly cited or review papers from the worker perspective. For example, there are many papers on the motivations of crowdworkers as well as on their legal status; of these, we selected only a few that (a) represented the majority of arguments made or (b) made alternative, but theoretically interesting arguments.

Finally, when a number of relevant papers had been identified, we utilized a snowballing approach to make sure we had not missed an essential source (Wohlin, 2014). This approach resulted in a final sample of 78 relevant papers discussing crowdwork platform governance and value to job providers.

3.2   Analysis

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[10] See https://aisnet.org/?SeniorScholarBasket.

Based on the review of the relevant literature, we first generated a classification of previous studies based on their overall focus and perspective on crowdworkers, job providers and the platform (Table A.1 in the appendix provides example papers, with further references provided in Table A.4). Most papers on crowdwork platform governance focus on the worker perspective (Nickerson, 2014), with less emphasis on the perspectives of the job provider and the platform. However, many papers discuss crowdwork from more than one agent's perspective, typically focusing on either the worker and the job provider or the worker and the platform. A few papers also provide a holistic perspective by considering the concerns of all three agents (see Table A.1).

Second, we generated a classification of crowdwork platform governance mechanisms by inductively coding the identified papers. We began by identifying all the different potential governance mechanisms mentioned in the papers. The initial list of codes included incentives, reputation, payment rules, decision rights, managing shared resources, managing producer/consumer and task/subtask relationships, contractual rights, sharing information between workers, fairness, transparency, security, accountability, trust, standardization and ethics. We then grouped similar codes and excluded some (e.g., those that were infrequently mentioned and not covered in depth in prior literature, making it difficult to articulate their significance in crowdwork platform governance). Iterating back and forth between the findings and the governance definitions from existing research, we ultimately (a) differentiated between governance mechanisms and the drivers of these mechanisms and (b) postulated two key crowdwork platform governance mechanisms (control and coordination) and three drivers of each mechanism (see Table A.2). Based on the theoretical and practical significance of the degree of routinization of work and the degree of centralization of crowdwork platform governance, we also coded the papers for their focus on routine and creative crowdwork as well as centralized, decentralized and hybrid governance. Notably, we found no papers on purely decentralized crowdwork platform governance, and the majority of papers focus on centralized platform governance of routine crowdwork (Table A.2).

Third, we analyzed the selected crowdwork papers with an eye towards identifying the value propositions for job providers. The initial list of codes included high quality of work, economic benefit,

technological efficiency, job provider anonymity, lack of long-term commitment, scalability, and fast task completion. Again, we grouped similar codes and excluded those that were infrequently mentioned and not covered in depth in prior literature. We converged on five value propositions (Table A.3).

Synthesizing insights from Tables A.1, A.2 and A.3, we identified key themes and gaps in the literature, as described below. We then moved on to develop the conceptual model of crowdwork platform governance to fill the identified gaps.

4. Prevalent Themes and Gaps in the Literature

The review revealed two broad themes. The first theme shows that governance by crowdwork platforms is generally achieved through control and coordination mechanisms. There are two important sub-themes here that also reveal two key gaps in the literature: differences between centralized and decentralized platform governance modes and differences between routine and creative crowdwork and its governance. The second theme demonstrates an assumption, prevalent in the literature, that effective crowdwork platform governance can increase the benefits for job providers; however, there is little theoretical or empirical work to support this relationship. We elaborate on each theme below.

4.1   Theme 1: Crowdwork Platform Governance through Control and Coordination

A dominant idea in this theme is that crowdwork platform governance consists of control and coordination mechanisms. Control mechanisms, which are critical for running a successful crowdwork platform, include quality control, the reputation system of workers, and the accountability of job providers (Table A.2). Quality control and accountability of job providers are forms of formal control (Kirsch, 1997). The former is achieved through direct outcome control (Eisenhardt, 1985), while the latter is achieved through behavior control (Eisenhardt, 1985; Kirsch, 1997), where the rules and procedures set on worker and job provider behavior are expected to lead to specific outcomes. The reputation system of workers,

meanwhile, is arguably a form of informal control (Eisenhardt, 1985; Kirsch, 1997) that aligns the goals of job providers, platform owners and workers (i.e., workers strive for higher reputation scores, which controls their behavior in line with the standards set by the platform owner and/or job provider).

Coordination mechanisms are also important for managing a prosperous crowdwork platform and consist of task management, incentive management and contract management (see Table A.2). Task management refers to platforms coordinating the flow of information related to dependencies among tasks (Crowston, 1997), but it can also allow for mutual adjustment between the workers directly (Mintzberg, 1980). Incentive management, meanwhile, refers to the processes of selecting and distributing incentives and rewards (beyond reputation) that motivate workers and job providers (Vakharia and Lease, 2015). Finally, contract management refers to managing the dependencies between types of workers, tasks, and payment rules and conditions (based on Malone and Crowston, 1990). A part of contract management is the selection of workers, which is often a multi-stage process in which workers decide whether to offer their services (based on task description, financial incentives, rumors about job provider, etc.) by submitting bids, and job providers decide which worker(s) to choose based on bid evaluations (Malone and Crowston, 1990).

The review shows that the role of control in crowdwork platform governance receives more research attention than does the role of coordination (Hein et al., 2016; Schreieck et al., 2016). Furthermore, routine and creative crowdwork platforms are increasingly distinguished in the literature, but little is known of how the governance done by platforms differs, or whether it should differ, for routine and creative crowdwork. Moreover, the spreading discourse on blockchain technology drives a growing interest in decentralized platform governance, but the understanding of its benefits and challenges is only beginning to emerge (Tate et al., 2017), with no studies on decentralized crowdwork platform governance and only a few studies on hybrid governance. We unpack each of these gaps in the following subsections.

4.1.1   Centralized and Decentralized Crowdwork Platform Governance

The dominant idea in this sub-theme is the extent to which crowdwork platform governance (control and coordination) is (or should be) centralized. The logic of the studies in this theme is that the degree of centralization impacts crowdwork platform governance. For example, it has been shown that centralized crowdwork platform governance can improve incentives as well as contract management through centralized decision-making (Whiting et al., 2016). However, the role of control and coordination in centralized and decentralized crowdwork platform governance has not been systematically addressed in existing literature. The review indicates that most existing crowdwork platforms govern centrally, while only a few studies have tried to design and implement single modules inside platforms under decentralized governance (see Table A.2).

4.1.2   Routine and Creative Crowdwork Platforms

The dominant idea in this sub-theme is the extent to which crowdwork platforms differ (or do not differ) in design, governance and value proposition depending on the degree of routinization of work. There are different governance challenges in routine and creative crowdwork platforms, such as the lack of job provider accountability, high turnover among workers, and standard quality control (Brawley and Pury, 2016; Deng et al., 2016). The logic of the studies in this theme conveys that these issues are likely to influence the kind of value delivered to job providers, such as the quality of work and the cost of labor. The literature shows an increasing number of studies on creative crowdwork platforms in addition to routine platforms (Table A.2). However, little is known regarding the differences between routine and creative crowdwork platform governance, and the kind of value these platforms deliver to job providers.

4.2   Theme 2: Crowdwork Platform Governance Affects Benefits for Job Providers

Existing crowdwork research assumes that good governance can improve the value generated by crowdwork for job providers. As shown in Table A.3, crowdwork is strategically vital for organizations (job providers) because it can lower costs and deliver a quick turnaround on tasks (Al-Ani and Stumpp,

2016; Agrawal et al., 2015; Bergvall-Kåreborn and Howcroft, 2014; Brawley and Pury, 2016; Buettner, 2015; Chen and Horton, 2016; Deng and Joshi, 2016; Gould et al., 2016; Gupta et al. 2014; Harris, 2015; Kittur et al., 2013; Rzeszotarski and Kittur, 2012). However, organizations face many challenges in extracting value from crowdwork. For example, a risk of losing control over the activities of workers; challenges related to quality control, reputation inflation and complex task management; and a high churn rate of crowdworkers all threaten the ability of job providers to achieve lower costs and speedy delivery of high-quality results (Deng et al., 2016; Durward et al., 2016; Ma et al., 2016). Many of these challenges appear to be related to governance, but there is a lack of studies explicitly addressing this relationship.

Based on the themes and gaps explicated above, in the following section, we develop a conceptual model of crowdwork platform governance.

5. Crowdwork Platform Governance: Mechanisms, Drivers and Outcomes

In the following sections, we develop a conceptual model of crowdwork platform governance (see Fig.1). The central construct of this conceptual model is *crowdwork platform governance effectiveness*, which refers to the degree to which the control and coordination of platform resources and activities help to achieve the desired results (e.g., benefit all stakeholders' interests) (see Table 2 for the definitions of all constructs).
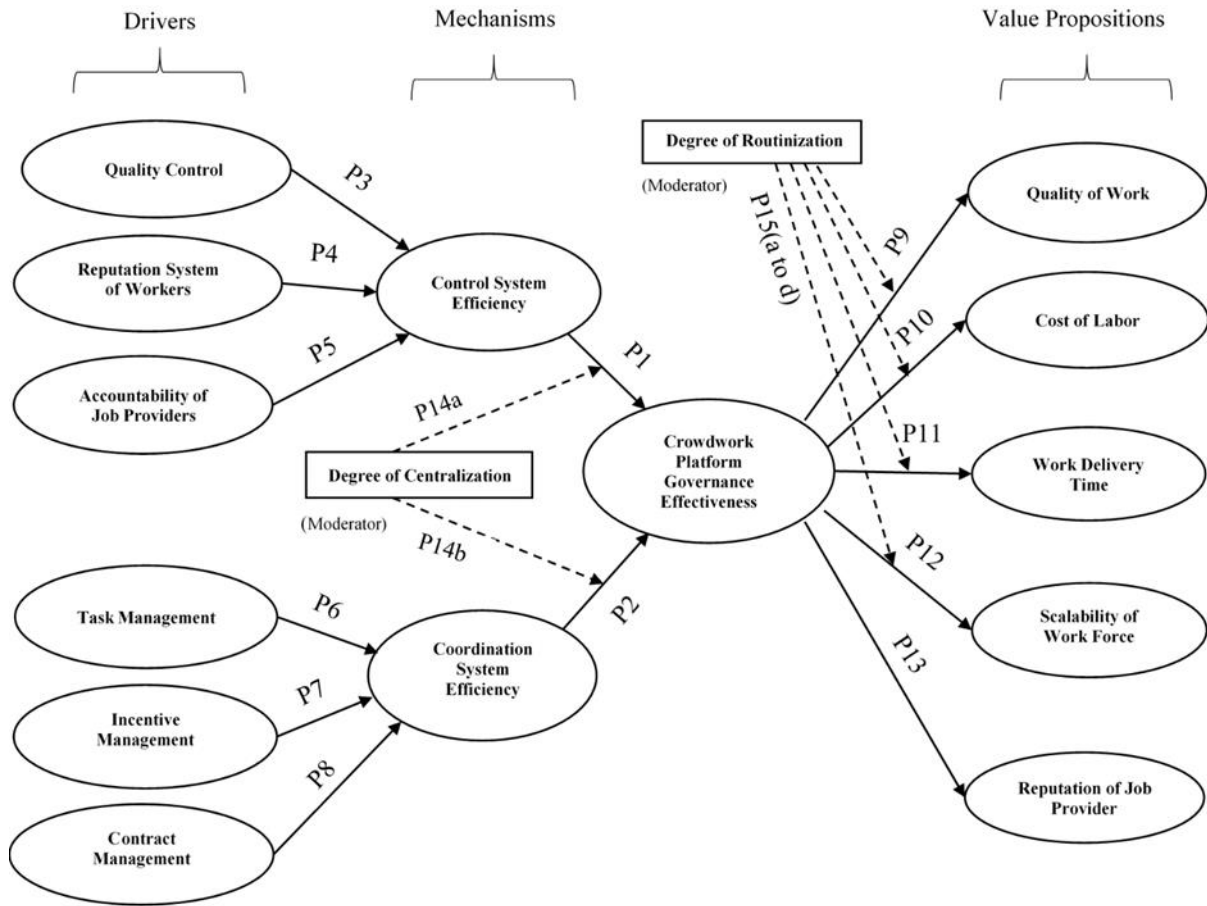
Fig. 1. Conceptual model of crowdwork platform governance.

Overall, the conceptual model comprises the following components: (1) mechanisms, or the processes through which crowdwork platform governance is realized (i.e., coordination and control); (2) drivers, or the independent variables that drive the control and coordination mechanisms; and (3) value propositions, or the outcomes of crowdwork platform governance in terms of value delivered to job providers. In addition, the model specifies two key moderating effects: (1) the effect that the degree of centralization of crowdwork platform governance has on the relationship between crowdwork platform governance mechanisms and crowdwork platform governance effectiveness; and (2) the effect that the degree of routinization of work has on the relationship between crowdwork platform governance effectiveness and the value propositions delivered to job providers.

5.1   Mechanisms of Crowdwork Platform Governance Effectiveness

103

Based on the literature, we posit that there are two key mechanisms (i.e., processes) through which crowdwork platform governance becomes effective. We label these control and coordination system efficiency (Table A.2). Efficient joint functioning of control and coordination systems is vital for running and managing crowdwork platforms. Control, which comprises formal and informal control, monitors and directs the processes and activities within the platform (Schreieck et al., 2016). Meanwhile, coordination manages the dependencies between crowdwork activities (e.g., between tasks, between workers and job providers) (based on Crowston, 1997; Malone and Crowston, 1994; Kittur et al., 2013).

Control has to do with activities that verify performance outcomes and activities that verify workers' and job providers' compliance with platform standards and policies. Control system efficiency is driven by (1) outcome-oriented formal performance control (Eisenhardt, 1985; Kirsch, 1997), which is established by quality control; (2) informal social control (ibid.), which is established by reputation systems of workers; and (3) behavior-oriented formal administrative control (ibid.), which is established by the accountability of job providers.

Coordination has to do with activities that manage the core functionalities of the platform. Coordination system efficiency is driven by (1) task management, which coordinates the workflow, thereby creating individual but interdependent work plans for each worker, as well as opportunities for mutual adjustment (Mintzberg, 1980); (2) incentive management, which coordinates the appropriation of incentives used to motivate workers, align stakeholder interests and complement the informal controls (Vakharia and Lease, 2015); and (3) contract management, which coordinates the formation of agreements between job providers and workers about the terms of work. Contract management is essential for creating actionable work plans and setting ground rules, which form the basis for verification of compliance by the control system (Malone and Crowston, 1990).

5.1.1 Control System Efficiency

The purpose of the control system is to ensure that all activities are carried out in accordance with the plan, rectify any mistakes and prevent them from recurring (Fayol, 1949, p. 77). Specifically, in

crowdwork, the purpose of managerial control systems is to help reach business goals by facilitating workers' participation and eliciting their best performance (Saxton et al., 2013). Accordingly, we define *control system efficiency* as the degree to which the crowdwork platform verifies that all activities that are carried out on the platform (e.g., quality assurance) are within the desired range and enables taking corrective actions when needed (see Table 2). For example, quality control is key in driving the verification of work quality and in taking corrective actions (e.g., well-functioning quality control should avoid false rejections of work and disgruntled workers). The reputation system drives the verification of crowdworker identity and qualifications and enables taking corrective actions (e.g., ill-qualified workers should be filtered out of the crowdwork platform through low reputation scores) (Horton and Golden, 2015). Accountability of job providers drives the verification of job provider identity and responsibility towards workers, with unscrupulous job providers being filtered out of the platform.

Taken together, an efficient control system (which verifies that all activities carried out on the platform are within the desired range and makes it possible for corrective actions to be taken) positively affects crowdwork platform governance effectiveness. Thus, we posit that:

P1. *Control system efficiency has a positive effect on crowdwork platform governance effectiveness*.

5.1.2   Coordination System Efficiency

The purpose of the coordination system is to handle the core functionalities of the platform and to manage the interdependencies among them. Thus, we define *coordination system efficiency* as the degree to which the crowdwork platform manages the dependencies among crowdwork activities (e.g., between tasks, between workers and job providers) (Table 2). Coordination in crowdwork platform governance is vital to improving workflows and work output (Gray et al., 2016). For example, managing dependencies between tasks and sub-tasks drives the ability to coordinate large-scale tasks and improves the completion and acceptance rates of such tasks (Chen et al., 2014). Incentive management, meanwhile, manages the

dependencies between workers' performance and different types of rewards available to them (Harris and Wu, 2014). For example, high pricing of tasks lowers the output for the job provider due to budgetary constraints. Conversely, low pricing of tasks results in worker dissatisfaction regardless of reputation earned (Goel et al., 2013). Therefore, managing the dependency between performance and incentives can help balance the limited budget of the job providers and the opportunistic behavior of crowdworkers (Goel et al., 2013). Contract management handles the dependencies among job provider, platform and worker. The presence (or absence) of contracts and their conditions is vital in crowdwork platform governance, as different contracts have varying payment structures (Agrawal et al., 2015; Vakharia and Lease, 2015) and place distinct demands on platform and stakeholder resources. Thus, contract management is essential for creating actionable work plans and setting ground rules.

Taken together, an efficient coordination system (that manages the dependencies among crowdwork activities) positively affects crowdwork platform governance effectiveness. Thus, we posit that:

P2. *Coordination system efficiency has a positive effect on crowdwork platform governance effectiveness*.

5.2   *Drivers of Crowdwork Platform Governance Mechanisms*

Each of the two identified crowdwork platform governance mechanisms (i.e., control and coordination system efficiency) is driven by three key drivers (Table A.2). Control system efficiency is driven by quality control, the reputation system of workers and the accountability of job providers. Coordination system efficiency is driven by task, incentive and contract management. We examine the effect of these drivers on control and coordination system efficiency in the following sections.

5.2.1   *Quality Control*

Quality control refers to the evaluation schemes that assess the degree to which a submitted work meets the set requirements or specifications of a job (Table 2). Quality control enables the assessment of work performance as well as the correction of mistakes in submitted works (Vakharia and Lease, 2015). Quality control deals with the algorithms and processes that are applied to assess work quality, as well as with the techniques and methods that are utilized to monitor workers and their accomplishment of work (Vakharia and Lease, 2015). For example, in Clickworker, plagiarism checking, peer review, and testing are utilized to assess work quality (Vakharia and Lease, 2015).

Therefore, quality control that effectively establishes outcome control positively affects the overall control efficiency of crowdwork platform governance by assessing work performance and revealing errors in submitted works. Thus, we posit that:

P3. *Quality control has a positive effect on control system efficiency*.

5.2.2   Reputation System of Workers

Reputation system of workers refers to the effectiveness of the reputation scheme – that is, the degree to which the system motivates workers to be competent and to comply with the rules of conduct (Table 2). Reputation systems function as an informal social control method that motivates workers' compliant behavior. There are different reputation systems from one platform to another. For example, TopCoder uses rating algorithms (Boudreau et al., 2016), while workers in other freelance platforms are monitored via activity logs. In many crowdwork platforms, such as AMT, the reputation rates are derived from job providers' feedback (Whiting et al., 2016). All reputation systems are designed to provide a reliable indication of the worker's future performance (Whiting et al., 2016) but also to function as an instrument of control that reinforces compliance. However, online reputation scores may also motivate bribes, begging, and threats (Horton and Golden, 2015). For instance, the lack of a reliable reputation system in AMT has led to crowdworkers enhancing their ratings by tacitly or explicitly agreeing to mutually recommend each other (Kittur et al., 2013).

Therefore, a reputation system that effectively institutes informal social control positively affects the overall control efficiency of crowdwork platform governance by motivating workers to be competent and to comply with the rules of conduct. Thus, we posit that:

P4. *Reputation system of workers has a positive effect on control system efficiency.*

5.2.3   Accountability of Job Providers

Accountability of job providers refers to the job provider's degree of answerability – that is, the degree to which job providers can be called upon to explain their decisions and actions with regard to submitted work (Table 2). Accountability of job providers functions as an administrative control that motivates job providers' compliant behavior. On AMT and many other crowdwork platforms, job providers can reject work without compensation or explanation, regardless of the actual quality of work (Brawley and Pury, 2016; Deng et al., 2016; Gaikwad et al., 2015). Exceptions include TopCoder, where feedback is provided to all workers, regardless of whether the submitted work is accepted or rejected. Accountability, thus, would require job providers to give a reason for rejecting work and serve as a deterrent to unfair or mistaken rejections.

Therefore, accountability of job providers that effectively institutes administrative control positively affects the overall control efficiency of crowdwork platform governance by motivating job providers to be fair and to comply with the rules of conduct. Thus, we posit that:

P5. *Accountability of job providers has a positive effect on control system efficiency.*

5.2.4   Task Management

Task management refers to the degree to which a crowdwork platform manages the interdependencies between tasks with different characteristics (e.g., task importance, task diversity, job autonomy, and task clarity) (Deng and Joshi, 2016). Task management includes various activities, such as dividing complex tasks into subtasks, managing and merging those subtasks (Kittur et al., 2013), as well

as facilitating mutual adjustment among workers performing inter-dependent tasks (Mintzberg, 1980). Task management is particularly crucial in the case of complex tasks with many dependencies and a need for multiple types of skill (Kittur et al., 2013).

Therefore, task management that orchestrates the sequencing and distribution of sub-tasks to willing and able workers (and allows for adjustments to this sequencing and distribution) affects the overall coordination efficiency of crowdwork platform governance by coordinating the pace and flow of work. Thus, we posit that:

P6: *Task management has a positive effect on coordination system efficiency*.

5.2.5 Incentive Management

Incentive management refers to the degree to which crowdwork platform governance manages dependencies between workers' performance and the incentives and rewards available to them. Incentive management is applied to increase worker participation and improve work practices through allocating incentives in a way that benefits both job providers and workers (Kittur et al., 2013; Vakharia and Lease, 2015) beyond the effects of informal and formal control (e.g., reputation and quality control).

Understanding and rewarding desired behavior is a challenge in crowdwork platforms (Kittur et al., 2013). Studies have shown mixed consequences of the impact of financial incentives on the quality of workers' submissions and emphasize the importance of intrinsic motivations, such as nonfinancial awards and credit, importance of tasks, and a collaborative atmosphere (Kittur et al., 2013; Mason and Watts, 2009). Therefore, incentive management also involves job providers' clear communication of desired behaviors. Furthermore, the alignment of these desired behaviors with worker incentives and motivations goes beyond control mechanisms (Kittur et al., 2013; Khanna et al., 2010; Ross et al., 2010). For example, incentive management includes making coordinated decisions about the degree to which incentives should be utilized individually or in combination, as well as making decisions about intrinsic vs. extrinsic rewards and managing them for competing effects (Vakharia and Lease, 2015).

Therefore, incentive management that clearly articulates the decisions regarding and distribution of incentives affects the overall coordination efficiency of crowdwork platform governance by aligning the interests of workers and job providers. Thus, we posit that:

P7. *Incentive management has a positive effect on coordination system efficiency.*

5.2.6   Contract Management

Contract management refers to the degree to which the contracts that govern work arrangements make it possible for the platform to manage interdependencies between job providers and workers. Contract management is a core functionality of the platform that coordinates work planning and the terms of a particular job, including job specifications, deadlines, delivery format, rules of engagement, and dispute resolution (Howcroft and Bergvall-Kåreborn, 2018). Given the lack of a personal relationship (or even a lack of direct communication) between the workers and job provider, the contract serves as the main point of reference for all parties. Contracts that are used to manage and coordinate the work may range in nature and complexity from general terms and conditions (e.g., AMT), to fixed price boilerplate contracts (e.g., 99design), to contracts with specific rules and conditions (e.g., TopCoder) (Agrawal et al., 2015; Vakharia and Lease, 2015).

Therefore, contract management that explicitly articulates the work arrangements on a platform affects the overall coordination efficiency of crowdwork platform governance by delineating the transactional engagement between job providers and workers. Thus, we posit that:

P8. *Contract management has a positive effect on coordination system efficiency.*

5.3   Crowdwork Platform Governance and Value Creation for Job Providers

Understanding the conditions for creating value-adding crowdwork poses an important strategic issue for many businesses. In this section, we focus specifically on the value propositions of crowdwork

for job providers (Table A.3) and theorize on how crowdwork platform governance effectiveness affects them. As these propositions are largely synthesized from extant research, we have kept this section brief.

5.3.1 Effective Crowdwork Platform Governance and Quality of Work

Quality of work refers to the degree to which a work task submitted meets the job specifications (Table 2). While better financial incentives do not necessarily lead to improvements in work quality (Kingsley et al., 2015), it has been shown that detailed and well-made task descriptions (part of task management) and quality control (QC) do increase the quality of work (Harris, 2015). Therefore, we expect that effective crowdwork platform governance – that is, the degree to which the control and coordination of platform resources and activities help to achieve desired results – positively affects the quality of work produced, increasing the value of crowdwork to job providers. Thus, we posit that:

P9. *Effective crowdwork platform governance has a positive effect on the quality of work.*

5.3.2 Effective Crowdwork Platform Governance, Cost of Labor and Work Delivery Time

Cost of labor refers to financial compensation paid by a job provider to crowdworkers in exchange for a work task accomplished, and *work delivery time* refers to the time it takes for crowdworkers to complete a work task (Table 2). "Fast" and "cheap" have been the main value propositions of crowdwork platforms for job providers since their inception (Gupta et al., 2014; Harris and Srinivasan, 2012; Kittur et al., 2013). Costs associated with crowdwork tend to be considerably lower than those related with more traditional systems of employment, and profit growth is a significant motivator for adoption (Bergvall-Kåreborn and Howcroft, 2014; Gupta et al., 2014). Effective crowdwork platform governance (through, for example, quality control) can reduce delivery time, while flexible contract and incentive management can reduce the costs of labor.

Therefore, we expect that effective crowdwork platform governance negatively affects (i.e., reduces) the cost of labor and the time it takes for crowd workers to complete a work task. Thus, we posit that:

P10. *Effective crowdwork platform governance has a negative effect on the cost of labor (i.e., cost decrease).*

P11. *Effective crowdwork platform governance has a negative effect on work delivery time (i.e., delivery time decrease).*

5.3.3   *Effective Crowdwork Platform Governance and Scalability of Workforce*

Scalability of workforce refers to the ability of the job provider to adapt the workforce size in response to market demand fluctuations (Table 2). Many freelance platforms appeal to job providers because they provide scalability and flexibility of workforce capacity through access to a large pool of varying levels of skill and experience without employment regulations (Alonso and Mizzaro, 2012; Agrawal et al., 2015; Bergvall-Kåreborn and Howcroft, 2014; Brawley and Pury, 2016; Buhrmester et al., 2011). However, lack of regulations can also lead to unfair treatment of workers and threaten the long-term sustainability of crowdwork (Kittur et al., 2013). Therefore, crowdwork platform governance through accountable providers, well-managed tasks and contracts is likely to attract well-qualified workers.

Therefore, we expect that effective crowdwork platform governance positively affects the ability of job providers to adapt the workforce size through the pool of crowdworkers available to them on the platform. Thus, we posit that:

P12. *Effective crowdwork platform governance has a positive effect on the scalability of the workforce.*

5.3.4   *Effective Crowdwork Platform Governance and Reputation of Job Provider*

Reputation of the job provider refers to the general standing of a job provider among the crowdworkers (Table 2). Since most crowdwork platforms currently offer no functionality to capture job provider reputation, crowdworkers tend to construct an idea of the reputation of job providers based on their behavior on the platform and share this information through other means. For example, in AMT, this information can reach workers via several external forums that crowdworkers use to evaluate job providers (Brawley and Pury, 2016). In many platforms, job providers also do not have to reveal their true identity; thus, their reputation is often entirely dependent on their behavior on the platform. Crowdworkers, particularly more experienced ones, use this information to refuse to collaborate with job providers known to exhibit unfair behavior (Brawley and Pury, 2016; Deng et al., 2016). However, it has also been shown that workers can be appeased when job providers give reasonable justifications for rejecting their work (Chen and Horton, 2016). Thus, effective crowdwork platform governance, through holding job providers accountable, is one way to influence job provider reputation positively.

Therefore, we expect that effective crowdwork platform governance positively affects the reputation of a job provider among the crowdworkers. Thus, we posit that:

P13. *Effective crowdwork platform governance has a positive effect on the reputation of job providers.*

Table 7

Construct Definitions

Construct	Definition	Example
Crowdwork Platform Governance Effectiveness	The degree to which the control and coordination of platform resources and activities help to achieve the desired results (e.g., benefit the stakeholders' interests) (based on Manner et al., 2012).	TopCoder uses a combination of complex quality controls via algorithms and reviewers, a reputation system based on workers' skills and the number of winning bids, task management through project managers and highly-skilled workers (copilots)[11] who have a contract with TopCoder, and incentive management (e.g., workshops, promotions) to increase governance effectiveness.

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[11] Copilots are highly-skilled workers who have received a promotion on the TopCoder platform and now run projects on the platform.

Construct	Definition	Example
Control System Efficiency	The degree to which crowdwork platform governance verifies that the activities that are carried out on the platform (e.g., workers' and job providers' compliance, work quality assurance) are within the desired range and enables taking corrective actions when needed (based on Fayol, 1949; Saxton et al., 2013).	TopCoder's control system can verify crowd workers' identity and take corrective action in the event that workers use fake usernames to increase their reputation.
Coordination System Efficiency	The degree to which crowdwork platform governance manages the dependencies among the work-related activities that are carried out on the platform (e.g., contract management, task management, incentive management) (based on Crowston, 1997; Malone and Crowston, 1994).	TopCoder uses a coordination mechanism via project managers and copilots to manage dependencies among complex tasks. These managers and copilots divide tasks into smaller tasks, decide whether the tasks should run in parallel or sequentially, and merge the final accomplished subtasks to deliver the work to the job provider.
Quality Control	The evaluation schemes that assess the degree to which a submitted work meets the set requirements or the specification of a job (Agrawal et al., 2015; Wais et al., 2010).	Clickworker uses plagiarism checks and peer review to assess the quality of the work produced (Vakharia and Lease, 2015).
Reputation System of Workers	The effectiveness of the reputation scheme, that is, the degree to which the system motivates workers to be competent and to comply with the rules of conduct (Whiting et al., 2016).	Upwork uses ratings ranging from 1 to 5 as the reputation scheme, based on scores given by job providers to workers.
Accountability of Job Provider	The degree of job providers' answerability – that is, the degree to which job provider can be called upon to explain their decisions and actions with regard to submitted work (based on Wood and Winston, 2007).	TopCoder provides feedback from reviewers and job providers to workers who are interested in the reasons for rejection. However, in AMT job providers can reject work without giving a reason (Brawley and Pury, 2016; Deng et al., 2016).
Task Management	The degree to which crowdwork platform governance manages the interdependencies among tasks (e.g., managing subtasks and distributing them among workers with various expertise and capabilities) (Kittur et al., 2013).	Clickworker platform manages tasks according to the job provider's requirements and compatibility of the worker. TopCoder uses project managers and highly-skilled workers to decompose tasks and run them in parallel or sequentially.
Incentive Management	The degree to which crowdwork platform governance manages the interdependencies between worker's performance and the incentives and rewards available to them (Harris and Wu, 2014).	AMT job providers may provide extra incentives to workers in the form of a reward payment (Harris, 2015). TopCoder awards prizes to winners (Kittur et al., 2013).
Contract Management	The degree to which the work contracts make it possible for the platform to manage interdependencies between job	AMT facilitates routine work based on a set fee but does not provide a contract. However, most platforms that facilitate creative work, like Upwork, support two

Construct	Definition	Example
	providers and workers (Agrawal et al., 2015; Vakharia and Lease, 2015).	types of contracts: hourly wage and fixed price (Agrawal et al., 2015; Vakharia and Lease, 2015).
Quality of Work	The degree to which a work task submitted meets the job specifications or the requirements of the job provider (Sarasua and Thimm, 2014).	AMT, 99designs and most other crowdwork platforms measure the quality of work only based on job provider's acceptance or rejection of the work.
Cost of Labor	Financial compensation paid by a job provider to crowdworkers in exchange for a work task accomplished (Agrawal et al., 2015; Kittur et al., 2013).	AMT's average cost of labor is $2/hour.
Work Delivery Time	The time it takes for crowd workers to complete a work task (Gupta et al., 2014; Rzeszotarski and Kittur, 2012).	AMT's crowdworkers accept and submit a task in 39 minutes on average (Brawley and Pury, 2016).
Scalability of Workforce	The ability of job provider to adapt the workforce size in response to market demand fluctuations (Buhrmester et al., 2011; Alonso and Mizzaro, 2012).	TopCoder has more than one million registered crowdworkers[12], and AMT has about 500,000 registered crowdworkers worldwide (Difallah et al., 2018). The larger the pool of workers, the better job providers are able to adapt their workforce size to market demand (Alonso and Mizaaro, 2012).
Reputation of Job Provider	The general standing of a job provider among the crowdworkers (Brawley and Pury, 2016).	AMT's external forums provide information about job providers' behaviors through workers' review and discussion of job providers and tasks.
Degree of Centralization	The extent to which crowdwork platform governance (i.e., the control and coordination systems) is centralized, ranging from centralized to decentralized (Azfar et al., 2001; Scholz, 2016).	AMT and Upwork use centralized governance. There are no examples of completely decentralized crowdwork platform governance based on the literature review.
Degree of Routinization	The extent to which the tasks are accomplished through a repetitive work process that follows explicitly prescribed simple instructions and requires minimal individual creativity from workers (Buettner 2015; Margaryan, 2016).	AMT tasks are more routine (e.g., tagging pictures and filling surveys), whereas Upwork tasks are more creative (e.g., web development and graphic design) (Margaryan, 2016).

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[12] https://www.topcoder.com/blog/1-million-members-strong/ (retrieved 16 October 2018)

5.4   Contingencies of Crowdwork Platform Governance

Most platforms, for both routine and creative crowdwork, govern through centralized schemes (Table A.2), with a few exceptions in which governance is done through a hybrid model (e.g., some specific drivers of governance, such as reputation and quality control, are managed in a decentralized manner). For instance, Whiting et al. (2016) designed and developed crowd guilds, which are decentralized groups of workers who certify the quality of each other's work collectively via a double-blind peer assessment. Most studies of crowdwork also focus on routine work platforms, like AMT, while there are only a few studies on platforms for creative work, like Upwork (Table A.2). Nonetheless, as highlighted earlier, recent research is increasingly suggesting that many of the challenges of crowdwork could be eliminated, and its benefits enhanced, if it were to go beyond traditional centralized arrangements by drawing on ideas of cooperativism and worker-owned and -managed platforms (Gaikwad et al., 2015; Scholz, 2016). The emergence of new technical architectures can help to realize these seemingly utopic decentralized governance schemes (Tate et al., 2017). Similarly, with microtask crowdwork platforms such as AMT suffering from a bad reputation and an exodus of workers (Deng et al., 2016), job providers must increasingly consider whether crowdwork is also suitable for more complex and creative tasks, as well as how to best govern creative crowdwork. For these reasons, we theorize on how the degree of centralization of platform governance and the degree of routinization of crowdwork may change some of the relationships outlined above.

5.4.1   Degree of Centralization of Crowdwork Platform Governance

The *degree of centralization* refers to the extent to which the crowdwork platform governance (i.e., the control and coordination systems) is centralized (Table 2). As such, we expect that the degree of centralization will moderate the effect of control and coordination mechanisms on crowdwork platform governance effectiveness.

With regard to control, centralized governance lowers costs and permits more control by upper management (in this case, platform owners and job providers), whereas decentralized governance delegates more control to workers (Baschab and Piot, 2007). By removing hierarchical power structures, decentralization of governance can decrease the misuse of power (Azfar et al., 2001). For example, blockchain technology can enable swift dispute resolution through the transparency provided by an audit trail of all transactions (i.e., job submission time, job assessment outcome); in addition, when the terms of a job are met, a payment can be made automatically via a smart contract that cannot be manipulated by any party (Tate et al., 2017). Thus, non-payment for accepted work (i.e., wage theft) would become inconceivable. Part of job provider accountability would, in essence, be coded into the platform architecture. In the current centralized systems, like AMT, wage theft happens regularly (Irani, 2015b) and exposes a clear deficiency in the control system (lack of job provider accountability).

Therefore, we posit that verification and corrective action (control) will have a relatively stronger positive effect on crowdwork platform governance effectiveness in centralized platforms, because verification and corrective action provide the mechanism that forces all stakeholders to abide by the rules and curtails misuse of power. Conversely, verification and corrective action will have a relatively weaker positive effect on crowdwork platform governance effectiveness in decentralized platforms, because decentralization of control requires that all stakeholders abide by their collectively-created rules, some of which may be coded into the platform (Azfar et al., 2001). Thus:

P14a. *Degree of centralization has a positive moderation effect on the relationship between the control system and crowdwork platform governance effectiveness.*

Centralization usually improves coordination, including resource allocation, incentive and contract management. Knowledge management and distribution of tasks and rewards can be easier and faster, as the basic questions of 'who does what, when, and what do they get for it' are decided centrally, thus not requiring time-consuming discussions or consensus (Whiting et al., 2016). Conversely, decentralized governance creates coordination challenges and demands for laborious consensus-based decision making. Recent research (Tate et al., 2017) suggests that blockchain-based decentralized contract management can

result in flexibility (the terms of smart contracts are, by definition, programmable) but also irreversibility and networked integrity (once a contract is published, any changes in it will be observable to the network, immutable, and applied equally). These many benefits, however, do not change the facts that (1) setting up such a smart contract system is necessary in a decentralized system (whereas a centralized system can function without contracts, with the intermediary platform serving as the 'trusted' third party arbitrator), and (2) setting up such a system will take some effort and, thus, will incur costs on the platform (and indirectly on job providers and workers).

Therefore, we expect that the management of dependencies (coordination) will have a relatively stronger positive effect on crowdwork platform governance effectiveness in decentralized platforms, because the management of dependencies between workers and job providers, tasks and incentives is essential in aligning stakeholder interests and actions in decentralized governance. Conversely, when coordination is centralized, everyone's interests and actions are aligned with those of the central actor through control; thus, less coordination effort is needed (Azfar et al., 2001). Thus:

> **P14b.** *Degree of centralization has a negative moderation effect on the relationship between the coordination system and crowdwork platform governance effectiveness.*

5.4.2   *Degree of Routinization*

The *degree of routinization* refers to the extent to which crowdwork tasks are accomplished through a repetitive work process that follows explicitly prescribed simple instructions and requires minimal individual creativity from workers (Table 2). Governance challenges have been found in both routine and creative crowdwork platforms (Brawley and Pury, 2016; Deng et al., 2016; Schörpf et al., 2017). For example, in AMT, the lack of job provider accountability has spawned external forums for information sharing among workers and high turn-over (Brawley and Pury, 2016; Deng et al., 2016). In creative crowdwork platforms, such as Upwork and 99designs, workers depend heavily on job provider ratings (e.g., to have access to higher paid jobs) and, thus, engage in the strategic selection of jobs to build

up their reputation. At the same time, creative crowdworkers feel that they often do the work out of interest, rather than financial incentives ("how low will I go?" often being the operating principle on price) (Schörpf et al., 2017). These issues are likely to have an effect on the quality of work, cost of labor, and other outcomes that job providers value. As such, we expect that the degree of routinization of work tasks will moderate the effect of crowdwork platform governance effectiveness on the value delivered to job providers.

With regard to the quality of work, it is clear that the routine work of repetitive tasks with "clear definitions" (Buettner, 2015) will (a) be easier to evaluate and (b) vary less in the quality of the output. Therefore, we posit that effective control and coordination are likely to have only a limited impact on improving quality:

P15a. *Degree of routinization has a negative moderation effect on the relationship between crowdwork platform governance effectiveness and quality of work.*

With regard to cost of labor and work delivery time, routine crowdwork also varies little in terms of the financial compensation provided (average $2/hour on AMT) and also in terms of the time it takes to accomplish microtasks (average of 39 minutes on AMT; see Table 2). Thus, because in routine work the costs are already low and the average delivery time is short, we argue that effective crowdwork platform governance has inherently a limited effect and consequently limited impact on these outcomes. Conversely, in creative work, effective crowdwork platform governance (e.g., well-defined contracts, well-functioning QC) can reduce costs of labor and delivery time more significantly. Evidence suggests that in creative platforms (e.g., Upwork), financial compensation for different jobs varies significantly, as does the complexity of tasks (Schörpf et al., 2017). In sum, we suggest that:

P15b. *Degree of routinization has a negative moderation effect on the relationship between crowdwork platform governance effectiveness and cost of labor.*

P15c. *Degree of routinization has a negative moderation effect on the relationship between crowdwork platform governance effectiveness and work delivery time.*

With regard to the scalability of workforce – that is, the ability of job provider to adapt the workforce size by having access to an adaptable pool of crowdworkers with varying skills (Alonso and Mizzaro, 2012; Agrawal, et al, 2015; Brawley and Pury, 2016; Buhrmester et al., 2011) – we expect that the workforce available for routine tasks is inherently more scalable because of the sheer size of the potential pool. While TopCoder is estimated to have more workers than AMT (about one million versus 500,000; see Table 2), TopCoder's workers are divided into programmers, designers and data scientists with different skills and areas of expertise. Thus, whereas all AMT's workers can, in principle, perform nearly any of the micro tasks posted on the platform, on TopCoder, worker and task types are more difficult to match. Therefore effective crowdwork platform governance is likely to have only a limited impact on the scalability of workforce provided by routine crowdwork platforms, while it is likely to enhance the scalability afforded by creative platforms. Thus, we posit that:

P15d. *Degree of routinization has a negative moderation effect on the relationship between crowdwork platform governance effectiveness and the scalability of the workforce.*

Finally, with regard to the reputation of job providers, it has been shown that accountability of job providers influences the behavior of workers doing both routine and creative crowdwork. Thus, we expect that effective crowdwork platform governance, in terms of holding job providers accountable, positively affects job provider reputation regardless of the degree of routinization (Brawley and Pury, 2016; Schörpf et al., 2017). Therefore, we do not posit a moderation effect in this case.

6   Implications for the Future of Value-Adding Crowdwork

Crowdwork is a new form of digitally mediated employment that involves the performance of tasks online for a fee by distributed independent workers. Crowdwork is performed through platforms, which function as intermediaries that orchestrate and facilitate the work through a set of governance mechanisms that control and coordinate the work process. As a novel socio-technical phenomenon that has the capacity to change the nature of work organization and to provide strategic value to workers and job providers alike, crowdwork is disrupting contemporary working arrangements (Forman et al., 2014) while also creating significant negative backlash, particularly because of reported unfair treatment of workers (Deng et al., 2016; Kittur et al., 2013). Thus, in this paper we set out to better understand how crowdwork platform governance delivers on this promise of strategic value to job providers, while also providing fair working conditions.

The contribution of this paper lies in advancing the conceptualization of crowdwork platform governance. The paper provides a coherent theoretical grounding for describing and investigating crowdwork platform governance arrangements through control and coordination mechanisms. We also highlight the role of the degree of centralization of platform governance and the degree of routinization of work as critical moderators of crowdwork platform governance effectiveness and its impact on job provider benefit. Furthermore, we offer new theoretical insights that lead to the consideration of additional value propositions for job providers, especially with regard to the quality of work and reputation of job providers, which are not often discussed in current literature on crowdwork platforms. In sum, building on prior crowdwork platforms research, this paper extends the construct of governance in the context of crowdwork platforms, discusses its relevance and benefits to job providers, and provides substantive directions for future research in the form of a set of propositions. We leave it to future research to extend this theoretical work by operationalizing and testing the proposed model. Next, we consider the theoretical and practical implications of the proposed model.

First, by unpacking crowdwork platform governance into two key mechanisms (control and coordination), we contribute to a better theoretical understanding of the crowdwork governance phenomenon. As highlighted earlier, prior research has often discussed governance issues in crowdwork platforms, but definitions have been broad and systematic investigations into governance scant (Nickerson et al., 2017). In particular, while control is often mentioned in the platform and crowd governance literature (e.g., Tiwana, et al., 2010), coordination is rarely mentioned. Most extant crowdwork literature talks of "management" (Deng et al., 2016), but the concept remains vague. Thus, this paper makes headway by deriving the definition and significance of the coordination mechanisms in crowdwork platform governance. While control is obviously important in all governance, we think coordination is particularly significant in crowdwork, because managing dependencies (e.g., between tasks, workers and job providers, incentives and performance) is key when work is *temporary*, *large-scale*, *distributed*, and *mediated*. Future research could further focus on the empirical examination of the coordination mechanism and its functioning in different crowdwork arrangements. Coordination is also of particular importance in decentralized crowdwork platform governance, as explained below.

The moderating effect of the degree of centralization highlights that the control mechanism is more critical to effective centralized crowdwork platform governance, whereas the coordination mechanism is more critical to effective decentralized crowdwork platform governance. Control, in terms of verification and corrective action, will have a stronger positive impact on centralized crowdwork platform governance effectiveness, which is more likely to suffer from power imbalances and power misuse (Azfar et al., 2001; Zyskind et al., 2015). Conversely, coordination, in terms of managing dependencies, will have a stronger positive impact on decentralized crowdwork platform governance effectiveness, which is more likely to suffer from disconnects, perturbations, process breakdowns, and laborious demands for consensus-based decision-making (Whiting et al., 2016). This also highlights that while the promise of decentralized platform architecture is becoming palpable with new technologies like blockchain (Tate et al., 2017), governance challenges, particularly those related to coordination, will likely increase in the short-term.

Thus, if the future of crowdwork is decentralized, coordination (and the task, incentive and contract management that drive it) will be the key to ensuring its success and strategic value to job providers.

From a strategic perspective, maintaining the quality and scalability of highly-skilled workforce through better governance can improve organizational dynamic capabilities (Teece et al., 1997) through the ability to: (1) adjust their production capacity on the go to meet the ebbs and flows of the market demand (Lepak and Snell, 1999), (2) execute pilots on innovation projects without disrupting the work of the permanent staff, or on emergent innovation that requires ad hoc skills, unavailable in the organization (Kittur et al., 2013), and (3) reach out to the "wisdom of the crowds" (Majchrzak and Malhotra, 2013). These three operational improvements are known to drive strategic value in terms of increasing organizational agility and generative capacity.

Second, the conceptual model helps us to theorize on what we consider the future of crowdwork. Based on trends in society and technology, as well as initial lessons learned from crowdwork arrangements reported in the literature, we expect that crowdwork will evolve beyond the current centralized governance arrangements (Gaikwad et al., 2015; Scholz, 2016; Tate et al., 2017) and will also have to become suitable for increasingly complex and creative tasks (Schörpf et al., 2017). Crowdwork has long since expanded beyond microtasks into citizen journalism, motor vehicle design, text editing, and similar work that requires ingenuity and professional expertise. These shifts, however, are also important to consider in governance, because, as the conceptual model shows, the degree of routinization of work impacts the extent to which effective crowdwork platform governance can influence the value that crowdwork generates. Specifically, the moderating effect of the degree of routinization on the relationships between crowdwork platform governance and the value propositions highlights that effective crowdwork platform governance is critical to overall value generation in non-routine work. Effective control and coordination are expected to have a strong positive impact on work quality, to reduce costs further, and to improve work delivery time in creative (i.e., non-routine) crowdwork platforms. Thus, we expect that effective crowdwork platform governance will become increasingly important as job providers increasingly move to crowdwork arrangements for more complex and creative tasks. However, with routine crowdwork platforms suffering

from unfair working conditions, high turnover and bad reputation (Deng et al., 2016; Kittur et al., 2013), their long-term sustainability is also in question and can be improved through better governance.

We summarize these thoughts about the future of value-adding crowdwork into a two-dimensional framework (Table 3), which we hope can serve as a guide for both researchers and practitioners (especially job providers).

Table 8

Future of Value-Adding Crowdwork

	Routine Work	Creative Work
Centralized Crowdwork Platform Governance	Digital Sweatshop	Talent Factory
Decentralized Crowdwork Platform Governance	Day-labor Marketplace	Talent Marketplace

In Table 3, we provide four metaphors for different crowdwork arrangements based on the degree of centralization of crowdwork platform governance and the degree of routinization of work tasks. The *digital sweatshop* (Pittman and Sheehan, 2016) and *talent factory* metaphors dominate the current crowdwork platforms that are characterized by centralized governance. The digital sweatshop refers to crowdwork sites like AMT, which operate with the principle of keeping costs down and profits up with little regard for the working conditions created for workers or the tools provided for job providers to extract value from crowdwork (e.g., no quality control scheme). This operating principle relies on outsourcing simple jobs to low-skilled, cheap labor with few alternative job opportunities. Conversely, the talent factory refers to crowdwork platforms that deal with more creative and complex work (e.g., Upwork, TopCoder). While talent implies value and the need for nurturing, the talent factory metaphor emphasizes the Tayloristic and functional attitude towards work organization (Donini et al., 2017). The talent factory metaphor emphasizes the ability of a platform to deliver, on-demand, the right individuals with the right

skills (Hewitt, 2009; Ready and Conger, 2007). In contrast to these metaphors, we suggest that future crowdwork platforms, which will be increasingly characterized by decentralized governance, will evoke *day-labor* and *talent marketplace* metaphors. While the operating principles of routine and creative work are still in place, both metaphors denote a shift in power; in these scenarios, both low- and high-skilled workers have more control over whom they sell their skills to at market price (Lee, 2014).

These four metaphors offer a useful starting point for job providers and platform owners to strategically think about work organization and platform design. Centrally governed platforms served as a stepping stone into establishing early forms of crowdwork. However, the emergence of decentralized governance – through, for example, blockchain technologies – is paving the way for the evolution of crowdwork platforms into a more cost-effective and equitable work ecosystem.

7   Conclusion

In conclusion, building on this theory review and conceptual model development, we provided a deeper insight into crowdwork platform governance, which could be used to inform employers, platform designers, and policymakers who have the power to forge a more attractive future of crowdwork for both job providers and crowdworkers. We hope to demonstrate that one avenue for such a shift lies in revisiting our assumptions concerning what crowdwork arrangements look like and rethinking the design and role of platforms in crowdwork. Particularly in the domain of low-skilled work, the platform can play a more prominent role in the integration of labor than is desirable; that is, it can describe and direct the work using Tayloristic hetero-direction (Donini et al., 2017). We suggest that addressing these issues should go beyond improving existing platform designs (such as updating AMT) to consider entirely novel, alternative platform designs. In summary, we are cautiously optimistic about the future potential of crowdwork to contribute to inclusion, equitable wages and flexible work arrangements for workers, while organizations can keep costs of labor in check and smoothly adjust to the ebb and flow in the demand for labor.

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Appendix

Table A.1

Overview of Crowdwork Literature Foci

Perspective	Author(s)	Description	Worker Focus	Job Provider Focus	Platform Focus
Holistic This perspective includes papers that have investigated crowdwork platforms based on all three agents' concerns: workers, job providers, and platforms	Kittur et al. (2013)	Outlines a general framework for the future of crowdwork that is fair and meaningful for workers and produces high-quality work for job providers			
	Deng et al. (2016)	Identifies crowdworker values (access, autonomy, fairness, transparency, communication, security, accountability, making an impact, and dignity); offers guidelines for job providers and AMT design			
	Rzeszotarski and Kittur (2012)	Presents CrowdScape, a system that supports the human evaluation of complex crowdwork through interactive visualization and mixed initiative machine learning	+	+	+
	Gould et al. (2016)	Tests an intervention that encourages workers to stay focused on the job provider's task after multitasking has been detected			
Worker & Platform This perspective includes papers that have investigated crowdwork platforms based on the concerns of workers and platforms	Zyskowski et al. (2015)	Examines how to make crowdwork accessible to crowdworkers with disabilities			
	Sarasua and Thimm (2014)	Examines the benefits of profiling crowdworkers; introduces the idea of crowdworker CV (and its dimensions)			
	Ye and Kankanhalli (2017)	Presents a model to explain the impacts of benefit and cost factors as well as trust on solver participation behavior in crowdsourcing	+	-	+
	Deng and Joshi (2016)	Explores the characteristics of crowdworkers, crowdsourcing jobs, and the crowdwork environment that collectively drives the crowdworkers to participate in open source work			
	Durward et al. (2016)	Investigates ethical issues in crowdwork (e.g., privacy, accessibility) and the impact of ethical issues on the sustainability of crowdwork for the worker			
Worker & Job Provider This perspective includes papers that have	Brawley and Pury (2016)	Studies AMT worker job satisfaction, information sharing and turnover; also examines best/worst behaviors by job providers	+	+	-

investigated crowdwork platforms based on the concerns of the workers and job providers	Chen and Horton (2016)	Investigates the impact of wage cuts on crowdworkers' behavior			
Single Agent This perspective includes papers that have investigated crowdwork platforms based on a single agent's perspective	Donini et al. (2017)	Considers the collective rights of independent digital contractors	+	-	-
	Horton and Chilton (2010)	Presents a model of workers supplying labor to paid crowdsourcing projects; estimates a worker's reservation wage (i.e., the smallest wage a worker is willing to accept for a task)	+	-	-
	Horton and Golden (2015)	Investigates factors that inflate reputation; also, proposes that aggregate private feedback scores from job providers to workers can be used by job providers to screen workers and make hiring decisions	-	+	-

Table A.2

Crowdwork Platform Governance Mechanisms (by degree of centralization of governance and degree of routinization of work)

Degree of Centralization	Routine / Creative	Author(s)	Governance					
			Coordination System Efficiency			Control System Efficiency		
			Contract Management	Incentive Management	Task Management	Reputation System	Accountability of Job Providers	Quality Control
Centralized	*Routine*	Fieseler et al. (2017)	+	+	+	+	+	+
		Harris (2015)	-	+	+	+	-	+
		Kittur et al. (2013)	-	+	+	+	-	-
		Hata et al. (2017)	+	-	+	-	-	+
		Deng et al. (2016)	-	+	-	+	+	-
		Brawley and Pury (2016)	-	+	-	+	-	-
		Rzeszotarski and Kittur (2012)	-	-	+	-	-	+
		Gould et al. (2016)	-	-	+	-	-	+
		Gupta et al. (2014)	-	-	-	+	-	+
		Horton and Chilton (2010)	-	+	-	-	-	-
		Deng and Joshi (2016)	-	+	-	-	-	-
		Chen and Horton (2016)	+	-	-	-	-	-
		Ipeirotis (2010)	-	-	+	-	-	-
	Creative	Agrawal et al. (2015)	+	+	-	-	-	+
		Horton and Golden (2015)	-	+	-	+	-	-
	Routine & Creative	Al-Ani and Stumpp (2016)	-	+	-	+	-	-
		Durward et al. (2016)	+	-	-	-	-	+
Hybrid	*Routine*	Whiting et al. (2016)	-	+	+	+	-	+

Degree of Centralization	Routine / Creative	Author(s)	Governance					
			Coordination System Efficiency			Control System Efficiency		
			Contract Management	Incentive Management	Task Management	Reputation System	Accountability of Job Providers	Quality Control
		Aiello et al. (2015)	-	+	+	+	-	+
	Routine & Creative	Chatterjee et al. (2015)	-	-	+	+	-	+

Table A.3

Value of Crowdwork Platform Governance for Job Providers

Author(s)	Value of Crowdwork Platform Governance for Job Providers				
	Quality of Work	Cost of Labor	Work Delivery Time	Scalability of Workforce	Reputation of Job Providers
Kittur et al. (2013)	+	-	+	+	+
Bergvall-Kåreborn and Howcroft (2014)	-	+	-	+	-
Brawley and Pury (2016)	-	+	-	-	+
Agrawal et al. (2015)	-	+	-	+	-
Deng and Joshi (2016)	-	+	-	-	-
Chen and Horton (2016)	-	+	-	-	-
Durward et al. (2016)	-	+	-	-	-
Al-Ani and Stumpp (2016)	-	+	-	+	-
Rzeszotarski and Kittur (2012)	-	-	+	+	-
Gupta et al. (2014)	-	+	+	-	-
Harris (2015)	+	+	+	-	-
Gould et al. (2016)	-	-	+	+	-
Buettner (2015)	+	-	+	+	-

Table A.4

Other Literature Informing Tables A.1, A.2 and A.3

Other Sources	Tables Informed
Chandler and Kapelner (2013)	Tables A2 & A3
Gould et al. (2015)	Tables A1, A2 & A3
Ryu and Lease (2011)	Tables A1 & A2
Jianhan et al. (2016)	Tables A1, A2 & A3
Mason and Suri (2012)	Tables A1, A2 &A3
Bigham et al. (2017)	Tables A1, A2 &A3
Finnerty et al. (2013)	Tables A2 & A3
Harris and Srinivasan (2012)	Tables A1, A2 & A3
Harris and Wu (2014)	Tables A1, A2 & A3
Celis et al. (2016)	Tables A1 & A2
Irani and Silberman (2013)	Tables A1 & A2
Irani (2015a, b)	Tables A1, A2 & A3
De Stefano (2016)	Tables A1, A2 & A3
LaPlante et al. (2016)	Tables A1 & A2
Smith et al. (2011)	Tables A1& A2
Kaufmann et al. (2011)	Tables A1, A2 & A3
Milland (2016)	Tables A1 & A2

3.   Research Paper 2

Crowdwork platforms: Juxtaposing centralized and decentralized governance

Authors: Elham Shafiei Gol, Michel Avital, Mari- Klara Stein

Abstract

Crowdwork is a novel form of digitally mediated work arrangement that is managed and organized through online labor platforms. This paper focuses on the governance of platforms that facilitate creative work— that is, complex work tasks that require high-level skill and creative workers. Crowdwork platform governance faces numerous challenges as a result of technology mediation, scalable and distributed workers, and temporary work arrangements. Creative crowdwork platforms, such as Topcoder, typically require additional governance structures to manage complex tasks. However, we know relatively little about creative crowdwork platform governance, as most existing studies focus on routine work platforms, such as Amazon Mechanical Turk. Accordingly, this paper explores how incumbent and insurgent creative crowdwork platforms are governed under centralized and decentralized modes. We conducted a comparative case study based on the analysis of two different cases: Topcoder, a successful commercial platform with a largely centralized governance structure, and CanYa, an emerging innovative platform based on blockchain technology with more decentralized governance. We identified and classified different governance elements related to work control and work coordination. In addition, we explored the characteristics of creative crowdwork platform governance with different degrees of centralization.

Keywords: Crowdwork Governance, Creative Crowdwork, Centralized Platforms, Decentralized Platforms, Blockchain, Tokenomics.

1   Introduction

Paid, online crowdwork refers to different types of remunerated digital work organized by means of online labor platforms, which are responsible for choosing, organizing, assessing and paying crowdworkers (Kittur et al., 2013). These platforms act as intermediaries between workers and job providers (Kittur et al., 2013; Deng et al., 2016). In order to manage the challenges of a distributed and scalable workforce, a governance structure is essential (Deng et al., 2016; Donini et al., 2017). Governance can help organize the relationships among the workers, platform, and job providers and ensure the long-term success of the ecosystem. In general, crowdwork platform governance refers to different policies, rules, and standards maintained on the platform (Deng et al., 2016, p. 281). Specifically, crowdwork platform governance includes control and coordination of platform resources and activities to help achieve the desired results (Gol et al., 2019). Control includes mechanisms such as quality control, a reputation system of workers and accountability of job providers, whereas coordination includes, for example, task management, incentive management, and contract management (Gol et al., 2019).

Crowdwork platform governance is plagued by many well-known challenges due to technology mediation, scalable and dispersed workers, and impermanent work arrangements (Gillespie, 2017). Furthermore, until now, most research on crowdwork platforms governance has focused on micro-task platforms like AMT. Broadly speaking, there are two types of crowdwork platforms: those for routine or micro-task work and those for non-routine or creative work (Gol et al., 2019; Margaryan, 2016). Routine work platforms, such as Amazon Mechanical Turk (AMT), involve micro-tasks, which are performed in seconds or minutes and are usually repetitive with no high level of skill requirement and minimal payment (e.g., tagging pictures) (Deng et al., 2016; De Stefano, 2016). In contrast, creative work platforms, such as 99designs, Upwork, and Topcoder, involve more professional and creative tasks, such as graphic design and web development. These tasks take longer to accomplish, require a higher level of skill and provide higher compensation for the workers (Buettner, 2015; Margaryan, 2016). The evidence suggests that such creative work platforms follow a considerably more complex governance structure than do routine work platforms like AMT (Vakharia & Lease, 2015). Meanwhile, with technologies such as blockchain making significant inroads, it has also become evident that crowdwork platform governance may be run in a centralized or a decentralized manner (Atzori, 2015; Gol et al., 2019; Hein et al., 2016). This trend may be especially important in creative work platforms where highly-skilled workers offer their services. Creative work

inherently requires more discretion, suggesting that platform control mechanisms may need to be adjusted to account for the particular nature of such work. Accordingly, the important question this paper explores is *how are creative crowdwork platforms governed under centralized and decentralized modes?*

This paper contributes to a better understanding of creative crowdwork platform governance under centralized and decentralized modes through a comparison of two case studies: Topcoder and CanYa. Topcoder is a long-standing (founded in 2001) and successful crowdwork platform that connects job providers with highly-skilled software developers, data scientists, and designers. The platform's governance structure is largely centralized. CanYa is an emerging blockchain-based crowdwork platform (founded in 2015) that seeks to create multiple decentralized exchanges, one of which is CanWork, a marketplace through which highly-skilled freelancers can offer their services. Our findings demonstrate that there are significant differences between centralized and decentralized governance mechanisms related to platform control, work control and work coordination. For example, while centralized Topcoder is owned by shareholders (held by parent companies), decentralized CanYa is owned by CAN token-holders (CanYa community members). The distribution of work in centralized Topcoder is based on competition (Gol et al., 2018), while in decentralized CanYa, work is distributed through a marketplace that matches job providers with workers (CanYa Services Pty. Ltd., 2018a). Moreover, Topcoder operates as a commercial company that maintains a community of workers and offers value-adding services to job providers to run complex jobs (Gol et al., 2018). Meanwhile, CanYa operates as an open source community and is only able to run relatively less complex jobs (CanYa Services Pty. Ltd., 2018a; CanYa Services Pty. Ltd., 2018b). In sum, this paper offers one of the first steps towards developing a systematic understanding of creative crowdwork platform governance under centralized and decentralized modes.

2   Theoretical Background

Governance has been poorly defined in crowdwork studies, and a review of the literature shows a lack of studies on different crowdwork platform governance mechanisms, especially in the domain of creative work platforms (Deng et al., 2016; Donini et al., 2017; Margaryan, 2016). Moreover, the crowdwork phenomenon is still in the early stages of development, the associated practices are still forming, and the governance processes are still flexible (Nickerson, 2014). Broadly speaking, crowdwork platform governance refers to the coordination of interactions and the management of dependencies among all parties on the platform (based on Crowston, 1997; Howcroft & Bergvall-Kåreborn, 2018; Schmidt, 2017), as well as the control of worker and job provider behaviour and the monitoring of their performance by means of rules, policies and standards (Deng et al., 2016; Manner et al., 2012).

Most research on crowdwork platforms and their governance assumes some degree of centralization is essential for successful governance (Vakharia & Lease, 2015). However, a few recent studies have emphasized that crowdwork platforms may be governed in a more decentralized manner—for example, by building on the ideas of worker-owned and -managed platforms (Gaikwad et al., 2015; Scholz, 2016). Centralized and decentralized modes of platform governance have different characteristics (Hein et al., 2016). Centralized governance can enable smoother coordination of workflows through central direction and a high level of control over workers' behaviors and their submission quality (Brown & Grant, 2005; King, 1983), whereas decentralized governance can enable smoother coordination of contracts among parties as well as more efficient and fairer dispute resolution (avoiding a centralized bottleneck) (Tate et al., 2017). However, quality control of workers' outputs has to be performed by costly consensus-based evaluation and will most likely depend on difficult-to-achieve, mutually agreed-upon standards (King, 1983). However, most of these specific governance mechanisms (e.g., quality control, dispute resolution, etc.) have not been studied across both centrally- and decentrally-governed crowdwork platforms. Thus, most of these advantages and disadvantages are assumed based on the general governance literature and lack empirical support. As such, this paper provides, to our knowledge, one of the first comparative investigations into crowdwork platform governance under centralized and decentralized modes.

2.1 Blockchain for crowdwork platforms

Current platform architectures support centralized governance by the platform owner. Decentralized crowdwork platform governance, thus, will rely not only on a different logic but also on a different technical architecture. Blockchain, a new distributed computing technology that is growing fast across industries, is currently considered the main contender for providing such an architecture. Through decentralized autonomous organizations (DAO), which function as business rules within smart contracts and possession rights listed on a blockchain, the envisioned possibility of decentralized governance (for crowdwork platforms and beyond) seems increasingly possible (Schweizer et al., 2017). In the crowdwork context, new forms of decentralized platform infrastructure provided by blockchain technology can enable members to reach consensus on critical issues (e.g., the identity of job providers and workers, job completion and payment conditions, etc.), without the need for a central platform owner or other third parties to function as intermediary and trustworthy arbitrators (Schweizer et al., 2017; Xu et al., 2016). Hence, blockchain-based crowdwork platform governance could improve governance efficiency by automating payments through smart contracts (i.e., payments are executed automatically when the conditions stipulated in the contract are met); by managing dispute resolutions decentrally, thus avoiding bottlenecks; and by making it easier to create and manage job-specific smart contracts (Tate et al., 2017).

3 Research Method

This paper follows the research design of a comparative case study based on the analysis of two different cases, allowing for a comparison of centralized and decentralized creative crowdwork platform governance. In contrast to a single case study, a comparative case study provides the possibility to perform a comparison across contexts and thus to achieve more robust conclusions (Yin, 2013). Specifically, we analyzed the Topcoder[13] and CanYa[14] platforms. We chose Topcoder because it is a successful creative crowdwork platform with a largely centralized governance structure. It works with many large companies such as IBM, Google, and NASA as job providers and attracts a large number of highly skilled workers. Topcoder holds online algorithm competitions as well as software development and software design competitions (Archak, 2010). As a comparison, we chose CanYa because it is an innovative platform based on blockchain technology. CanYa is an open ecosystem hosting a peer-to-peer service marketplace and includes decentralized applications using blockchain technologies (CanYa Services Pty. Ltd., 2018a). It is a member-owned, loosely organized entity that aspires to run as a DAO (i.e., decentralized autonomous organization). Consequently, relying on a lean organizational structure, CanYa expects to operate a profitable crowdwork platform with fees that are 20 times lower than those of other crowdwork platforms (CanYa Services Pty. Ltd., 2018a). Therefore, these two cases illustrate two radically different governance modes and form an ideal setting to perform the desired comparison.

3.1 Data collection and analysis

In the Topcoder case, data were collected through 16 open-ended and semi-structured Skype interviews with staff, workers and job providers, conducted in February and March 2018. Each interview lasted approximately 40 to 50 minutes. In addition, online data were gathered from the platform website, from Topcoder forums, and from the Slack community channel which is used by workers and staff. In the CanYa case, data were collected through eight semi-structured Skype interviews with staff and workers. The approximate time for each interview was between 40 and 60 minutes. Moreover, white papers about the platform were used as another important source of data. Furthermore, online data were gathered from the

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13 According to Mike Morris, Topcoder CEO, the platform included 1.2 million freelance developers in December 2017, and thus figure is increasing by a rate of 50,000 software developers every quarter (Talley, 2017).

14 According to CanYa community manager, the platform included 1300 freelance workers in August 2018 and is growing rapidly.

platform website, the CanYa blog and the Telegram community channel which is used by staff and workers. Detailed information regarding the interviewees is presented in Table 1.

Case	Interviewee Category	Interview Number	Role	Area of Expertise
Topcoder	Worker	12 [P1…P12]	Competitor, Co-pilot, Reviewer	Development, Design and data science, Programming
	Staff	2 [P13, P14]	Project manager, Community manager	Development, Community
	Job provider	2 [P15, P16]	Job provider	Private Company
CanYa	Worker	3 [P17…P19]	Developer, Designer, Accountant	Development, Design, Accounting
	Staff	5 [P20…P24]	Co-founder, CTO, Community Manager, Developer, Business Advisor	Development, Community

Table 1.   Overview of Interviewees across Cases

Building on the case study research strategy, we focused on the two cases to develop a richer insight into the dynamics of crowdwork platform governance in the underlying settings (Eisenhardt 1989). The purpose of the within-case analysis was to attain an understanding of the case stories and to perform analysis and organize data collection across the cases (e.g., making sure that data related to the same governance mechanism were available in each case). The data analysis within the two cases was accomplished using the same approach. We utilized the procedures presented by Huberman and Miles (1994) to perform qualitative data analysis. We performed iterative coding on the interview, documentary, and online data, initially via open coding and then by categorizing and altering the codes based on both data and theory. We coded for specific governance mechanisms related to control and coordination, as suggested both by the literature and the exploration of the data (e.g., reputation system, quality control, task management, incentive management, contract management, color rating, skill, motivation, complaint handling, rewards, bonuses, and payments). New factors not mentioned in previous literature, such as dispute resolution and payment system, emerged from the data. We grouped the codes according to control and coordination as well as centralized and decentralized modes (see Table 2) to identify the most effective way of categorizing our findings.

4   Findings

Table 2 provides an overview of the identified governance mechanisms at play on creative crowdwork platforms with different degrees of centralization. We used the ideas of work control and work coordination to provide the basis for identifying and classifying different governance elements. In addition, the element of platform control emerged as an important distinguishing characteristic between Topcoder and CanYa. This separation of *work governance* and *platform governance* echoes Gillespie (2017), who argues that platform governance consists of two aspects: governance of and governance by platforms. Governance of platforms refers to the rules that guide platforms in their role as intermediaries (we refer to this as platform control), while governance by platforms refers to the platforms' ability to mediate between sides, moderate content, and generally to coordinate and control the workflow (we refer to this as work control and work coordination).

Table 2 reveals that, overall, remuneration in Topcoder is based on competition, which means that usually only a handful of people among those who work on a project are actually paid for their work (Gol et al., 2018). On the other hand, CanYa is a marketplace that matches job providers with workers, where job providers seek desired workers based on the skills advertised on their profiles and make contracts with them (CanYa Services Pty. Ltd., 2018a). Topcoder is a commercial enterprise; its business model relies on nurturing a community of workers and providing value-adding services to job providers by taking over the

handling of complex jobs (Gol et al., 2018). Conversely, CanYa is an open source community and relies on community members (CAN token holders) to run the marketplace. Thus, it is not able to offer sophisticated or complex job handling services like those of Topcoder (CanYa Services Pty. Ltd., 2018a; CanYa Services Pty. Ltd., 2018b).

Specific governance elements provided particularly rich insights for comparison. For example, dispute resolution management, payment management and contract management served as rich entry points towards understanding decentralized governance, while task management and quality control served as rich entry points towards understanding centralized governance. As expected, we found that the platform owner plays a vital role in centralized crowdwork platform governance, whilemembers play a critical role in decentralized platform governance. We unpack each of the mechanisms in more detail in the table below.

	Governance mechanism	Topcoder	CanYa
Platform Control	Platform Management	Corporate management and senior community members	Community managers of the open source CanYa community (paid by CAN tokens)
	Platform Development	Developers employed by Topcoder	Developers of the open source CanYa community (paid by CAN tokens)
	Equity Ownership	Shareholders (held by parent companies)	CAN token-holders (held by the CanYa community members)
Work Control	Remuneration	Competition-based prizes and bonuses (only winners get paid)	Payment on delivery (or as negotiated in advance)
	Payment System	Brokered and intermediated by the platform	Direct payment via smart contracts (paid by CAN tokens)
	Quality Control	Reviewer-based (prior to delivery; done by platform's appointed reviewers)	Not offered yet[15]
	Reputation System for Workers	Seniority-based ranking	Stake-based ranking
Work Coordination	Task Management	The platform provides end-to-end built-in work process management that is complemented by appointed project managers and co-pilots	The platform provides only basic matching between job offers and workers
	Task Interdependence Management	Managed by co-pilots	Not offered yet
	Contract Management	Standard contract between platform and job providers, but no	Platform-generated smart contracts between job provider and workers

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15 'Not offered yet' describes governance elements that CanYa does not currently provide but plans to offer in the future.

		contract between platform and workers	
	Dispute Resolution Management	Arbitration by platform-appointed agent	Arbitration by platform-appointed third-party community member

Table 2.   Creative Crowdwork Platforms Governance: Comparison of Topcoder and CanYa

4.1   Governance of and by creative crowdwork platforms

Governance *by* creative crowdwork platforms refers to the rules and policies that the platform uses to control and coordinate the workflow, user behaviors and content (Gillespie, 2017). Work control and coordination are vital for running a crowdwork platform (based on Crowston, 1997; Malone & Crowston, 1994; Kittur et al., 2013). Control performs the monitoring and guiding of processes within the platform (Schreieck et al., 2016) as well as verifying the compliance of workers' and job providers' behavior against standards, policies and platform objectives (based on Wiener et al., 2016). Coordination manages the dependencies among crowdwork activities, such as dependencies between tasks or between the parties (based on Crowston, 1997; Malone & Crowston, 1994; Kittur et al., 2013; Fernandes et al., 2018). Based on the literature and our data analysis, we suggest that work control includes financial remuneration, payment system, quality control, and the reputation system for workers. Meanwhile, work coordination involves task management, task interdependence management, contract management, and dispute resolution management.

4.1.1   Platform control

As highlighted above, we suggest that platform control consists of platform management, platform development, and equity ownership (Brown & Grant, 2005; Gawer, 2014; Denis et al., 2018).

Platform management refers to the overall control over the platform environment and resources access, as well as the setting of standards and policies that guide all parties' behaviors on the platform (Brown & Grant, 2005; Franke et al., 2011; Chard et al., 2016). Our data show that in Topcoder, platform management is performed by platform staff and senior worker community members (e.g., community managers and workers promoted to a co-pilot role). As a community manager described: "*I'm the one who interacts with people and finds the issues they are facing on the platform*" [P13]. On the other hand, in CanYa, which is an open ecosystem for peer-to-peer services and consists of decentralized applications powered via a DAO (decentralized autonomous organization), all members can be part of the system infrastructure and governance by getting a stake on the platform. Different levels of stakes involve different capabilities and responsibilities, and the members are also paid for doing platform management tasks (CanYa Services Pty. Ltd., 2018a). As explained by one of the platform staff: "*What we are trying to do is to create an open ecosystem on the blockchain that allows people to be part of the system. So, if you stake with the CanYa system, then you can be part of the governance and structure. You can also be incentivized to do tasks within the system and get paid*" [P20].

Platform development refers to who is allowed to develop and improve the platform regularly and to what extent (Gawer, 2014). On Topcoder, platform improvement capabilities are restricted to platform-employed developers. As mentioned by a co-pilot: "*Topcoder's developer team is working on improving the platform; for example, they are building a new program which is called MVB, for the new members to help them get started on the platform*" [P5]. CanYa also has its own temporary development team, but it is moving towards becoming open-source-developed in the near future [P20, P22, P24] (CanYa Services Pty. Ltd., 2018a). Hence, any developers will be able to easily integrate new components, follow the platform style guide, join their application to the DAO and launch them (CanYa Services Pty. Ltd., 2018a).

Equity ownership refers to the amount of the business assets owned by the business owner (Denis et al., 2018). Topcoder has shareholders, and the equity is held by parent companies.[16] In contrast, CanYa equity is held by the CanYa token holders (i.e., community members who get a stake on the platform through buying CanYa tokens) (CanYa Services Pty. Ltd., 2018b). Accordingly, any decision rights granted to equity owners are distributed differently in each of these platforms, as well as any financial benefits accrued.

In sum, in centralized platform control, the platform owner plays a vital role in the governance *of* the platform, answering to shareholders. Conversely, in decentralized platform control, all members with a stake in the platform play a critical role in the governance *of* the platform and share the responsibility and accountability for its performance.

4.1.2   Work control

As highlighted above, work control involves monitoring and guiding processes within the platform (Schreieck et al., 2016) as well as verifying the compliance of workers' and job providers' behavior against standards and policies. We suggest that the distinguishing mechanisms of work control include financial remuneration, payment system, quality control, and the reputation system for workers.

Financial remuneration is a key apparatus of creative crowdwork platform governance that controls workers' behaviors by motivating them to take part in the crowdwork platform and by incentivizing them to deliver quality work (Harris & Wu, 2014; Gol et al., 2018). In Topcoder, financial remuneration is competition-based. The platform hosts weekly cash prize competitions in algorithm, design, and software development fields. The prize usually goes to the winner of the competition as well as a few runners-up who also submitted high-quality work (Archak, 2010). Thus, creative workers are motivated to participate in these risky competitions by the chance to win a significant prize (Archak, 2010; Gol et al., 2018). Further, some of the workers mentioned that the prizes for jobs on Topcoder are higher than on other platforms, which is one of the leading factors that motivate them to participate in this platform over others [P2...P4, P5, P7, P9...P12]. Per one co-pilot: "*If you are an active member, you can earn a lot of money here in comparison with other platforms. I know some members who can earn $20,000 per month, and other members can earn $2000 or $3000 on average*" [P4]. In contrast, CanYa incentivizes workers and job providers to join to the platform by reducing fees to 1% (about 20 times lower than the rate of other crowdwork platforms, such as Upwork and 99designs) [P20-P23]. According to one employee of CanYa, "*This means a more efficient market with more money in the pockets of our freelance workers*" [P21].

Moreover, CanYa includes some lightweight decentralized applications that can be used by anyone for free [P20, P22]. These apps are loosely dependent on the CanYa platform and designed to accomplish a particular task; for example, CanInvoice permits users to generate, save and share invoices (CanYa Services Pty. Ltd., 2018a). These apps are intended to share the advantages of decentralized technologies with the broader community [P20, P22], but they also reinforce the attractiveness of the platform by increasing the usefulness of CanYa tokens and attracting new members ("*come for the tool, stay for the ecosystem*" being the operating slogan; CanYa Services Pty. Ltd., 2018a). Furthermore, CanYa will be run entirely by DAO in the future, which means that users who are token holders will run the platform (CanYa Services Pty. Ltd., 2018a; CanYa Services Pty. Ltd., 2018b). Therefore, they will be financially incentivized to improve their performance within the platform [P20, P24] and get paid with CanYa coin for doing tasks related to the running of the CanYa platform (McLoughlin, 2018).

Just as the rules of financial remuneration differ significantly between the focal platforms, so do the **payment systems**. Delays in payments due to inefficiencies in the payment system constitute one of the major problems reported in existing crowdwork platforms (Zhang & Van Der Schaar, 2012). In Topcoder, the payment system is centralized, and payment for a job is made ahead of delivery by job providers [P4,

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16 Information retrieved from https://www.topcoder.com.

P13]: "*Customers pay us ahead of time*" [P13]. The payment to workers is made via the current banking system and via online transfers from Topcoder's account to the workers' accounts. Delays may occur in payment processing due to account verification issues: "*It happened one or two times that Topcoder paid us with a delay due to some account verification issues*" [P2]. This system also excludes workers without international bank accounts. Conversely, CanYa has a decentralized payment system based on the blockchain technology. CanYa created its own currency called CanYaCoin (CAN) [P20…, P24]. The CanYaCoin improves the platform's payment system, providing a trust-less, decentralized, and hedged escrow service[17] to solve the problem of currency inflation by maintaining the escrow value, regardless of the token price (CanYa Services Pty. Ltd., 2018a; CanYa Services Pty. Ltd., 2018b). Payments from job providers to workers can thus be made without an intermediary and without delays.

Quality control is necessary to verify the quality of work and in performing corrective actions such as preventing false rejections of work and allowing for the correction of mistakes in a worker's submission (Vakharia & Lease, 2015). In Topcoder, there are reviewers for each project that check the quality of work. These reviewers are selected and promoted from the pool of highly skilled workers who have at least one winning submission in their profile [P2…, P6]. Furthermore, Topcoder has developed scorecards to assess the quality of worker's submissions; these are prepared for each project (to cater to different standards and requirements), and the workers' submissions must be checked and assessed against the performance metric in the scorecards. The final score then indicates the winner of the competition [P5, P6]: "*The reviewers choose from 1 to 5 for each question. For example, does this design have the Apple design standard? The final score then gives you a score of 98%. This score indicates the winner*" [P4]. Therefore, quality control is done in a centralized process via highly professional workers within the platform. By contrast, CanYa does not currently have a quality control system, but they do have a plan to develop a review and feedback system in the future [P20, P22, P24]. Thus, quality control is currently performed by the job providers themselves, creating an environment for potential complaints by workers about unfair rejections.

The **reputation system for workers** is used as an informal social control in the creative platforms for verifying the qualifications of workers and motivating them to abide by the rules of conduct (Horton & Golden, 2015). In Topcoder, the reputation system includes two parts. The first part is a color rating to indicate the worker's level of experience (from novice to experienced worker), based on the number of competition wins: "*In Topcoder we have different colors from red to grey. If you are very experienced and win a lot, you get red. Colors are used only in hackathons that are held by Topcoder. The Hackathon usually has a big prize and is sponsored by a big company such as Google or General Electric*" [P2, P3, P5]. The second part of the reputation system involves different roles within the platform, such as co-pilot and reviewer (Gol et al., 2018). Workers with sufficient experience (i.e., a few wins) can receive a promotion within Topcoder to a co-pilot role (allowing them to run projects) or to a review role (allowing them to review other workers' submissions) [P3, P4, P6]. In addition, the behavior and profiles of workers are monitored so that they can be assigned to private projects requiring specialized skills. As one co-pilot said: "*Sometimes, we have a project where we need machine learning and AI skills, but we have only a few members who have these skills. We reach out to those members and [tell] them, 'hey, we have this project and we need your skills.' So, we don't create a challenge for everyone around the world. We reach out to one or two people who are very good at [the relevant] technology.*" [P4].

Unlike TopCoder, CanYa does not have a ranking system for workers based on stars or colors, but the CanYa DAO includes different member levels: agent, admin, and core. Agents accomplish basic tasks in the DAO after staking a small number of CAN tokens needed for DAO entry. Admins govern agents and

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17 "The hedge is a Bancor Array Token that connects with a basket of Ethereum stable coins, such as the Digix gold token and the DAI USD token. This will create an internal pool in order to provide collateral to hedge the amount of cryptocurrency sent to the smart contract. Bancor technology will provide the price oracle for the CAN token. The outcome is that the value of the invoice is stable, despite fluctuations in price. Intended recipients will be paid a fixed value, but not a fixed amount of CAN tokens" (CanYa Services Pty. Ltd., 2018a, p. 25).

accomplish more complicated and higher-level tasks in the DAO, which have results with broad impact such as approvals, curation, and arbitration. Admins need a higher stake and more experience in the DAO, which is demonstrated by passing a reputation threshold to ensure that they have socially proven their commitment to the platform. Finally, core members of the CanYa Team handle complex matters such as funding approvals and changes to the CanYa DAO and CanYa Core. As the CanYa DAO develops, admins may want to join the core level by staking a much higher amount. Progressively, this should lead to the CanYa DAO being governed by the DAO members and becoming fully decentralized (CanYa Services Pty. Ltd., 2018a). Members can leave the DAO and retrieve their stake at any time. The stake is held to avoid dishonest actors within the DAO and to motivate long-term commitment (CanYa Services Pty. Ltd., 2018a). Furthermore, in the future, CanYa is planning to run a skill proof decentralized app, which verifies the workers' claims regarding their skills using other workers' votes. Agents are rewarded for voting on the claims, and admins are paid to prove the claims (CanYa Services Pty. Ltd., 2018a). Therefore, members, instead of the platform owner, will play a vital role in the functioning of the reputation system.

In sum, in centralized work control, the platform owner plays a vital role in setting up the structure and mechanisms through which governance *by* the platform is done (e.g., in Topcoder, a layered structure of project managers, co-pilots and reviewers performs work control on behalf of the platform owner). Conversely, in decentralized work control, all members with a stake in the platform play a critical role in participating in governance *by* the platform. Such decentralized control procedures take time to develop; as we can see from our data, many of the essential work control mechanisms in place in Topcoder are still under development in CanYa.

4.1.3   Work coordination

As highlighted above, coordination involves the managing of dependencies among crowdwork activities, such as dependencies between tasks or between parties (based on Crowston, 1997; Malone & Crowston, 1994; Kittur et al., 2013). Work coordination involves task management, task interdependence management, contract management, and dispute resolution management.

Task management refers to the management of a 'job' from the 'offer' stage to 'submission' to 'completion' through a process that facilitates the capturing of workers' knowledge (Vukovi, 2010). Topcoder usually runs complex projects in which project managers, sometimes together with co-pilots, create a proposal and a game plan including the number of challenges for running the project and the budget for each challenge. Then, if the job provider approves the proposal and game plan, the platform starts the project, runs the challenges, and integrates deliveries from different challenges. Finally, the completed project is delivered to the job provider [P3, P4, P5..., P7, P10, P11]. Therefore, the task management in Topcoder is centralized and is the key value-adding service Topcoder offers to job providers. In contrast, CanYa lacks a full task facilitation service. Thus, the platform only performs basic matching between job providers' requirements and workers' skills based on their profile information (CanYa Services Pty. Ltd., 2018a). As such, CanYa is only able to run comparatively less complex jobs (CanYa Services Pty. Ltd., 2018a; CanYa Services Pty. Ltd., 2018b) on the platform.

Task interdependence management is part of task management but is worthy of separate consideration. It manages the interdependencies between tasks, such as splitting the complex task into smaller tasks, managing those subtasks and spreading them among crowdworkers with different skills and capabilities (Kittur et al., 2013). In Topcoder, a project manager and a co-pilot are assigned for each project. Together, they cover the task interdependence management based on their knowledge and experience, as described by a co-pilot: "*My responsibility as a co-pilot is to take a project and divide it into small pieces and run the challenges. In each challenge, we have to create a very small part of the whole project*" [P5]. A project manager explained the rules of breaking projects into smaller tasks: "*It's based on experience. As a typical rule, I try to run challenges that I think the developers in their free time might be able to work on and get done in 3 days*" [P14]. In contrast, in CanYa there is currently no task interdependence management.

Contract management is considered another essential governance mechanism and a core platform functionality for managing the interdependencies among workers and job providers and coordinating the

work plan, including deadlines, job conditions, and delivery format (Agrawal et al., 2015; Vakharia & Lease, 2015; Howcroft & Bergvall-Kåreborn, 2018). In Topcoder, there is no contract between a job provider and a worker; instead, the contract is made between the Topcoder as a platform owner and the job provider for each project. The contract covers worker payments and Topcoder consulting fees [P4, P6, P7]. There can also be a contract between Topcoder and the highly skilled workers in the co-pilot and reviewer roles [P3, P4, P6, P7, P14] but no contract between regular workers (participants in the competitions) and Topcoder. Such a contract between Topcoder and co-pilots/reviewers is made to protect the rights of the platform owner only when the project is private: "*If the project is open, we don't sign any contract, but when the project is private, we should assign a document, scan it and send it to Topcoder. [The document states] that I cannot take this project as a private job off the platform and I cannot go to another company and say, for example, 'hey, I did this project before for company X'...*" [P4]. CanYa uses Can Escrow as a contract between job providers and workers. Can Escrow is a smart contract that is used to hold the payment (secure cryptocurrency) for the intended person. Entry currency is transformed to CAN before being held in escrow. The escrow is joined with a hedge that tries to maintain the value of the escrow in case of token price fluctuation (CanYa Services Pty. Ltd., 2018a; CanYa Services Pty. Ltd., 2018b). A CanYa member explains the process as follows: "*We've just released the escrow contract, which can release the exchange module to pay. So, now what we believe is that the client will come and reach out to the worker and then have a discussion with them [to] agree on the job, and the contract will begin*" [P20]. Therefore, contract management is decentralized in this platform. Moreover, in the future CanYa intends to run some new decentralized apps including CanHire and CanJob. The CanHire app is being developed as a platform that allows employers to display their open vacancies. Smart contracts will be used in this app as the escrow of payment (CanYa Services Pty. Ltd., 2018a; CanYa Services Pty. Ltd., 2018b). The CanJob app, also in development, will be used for small local jobs (e.g., painting, plumbing, etc.). Job providers will be able to insert job posts, and payments will be held in escrow. Any workers who complete the task will receive a review, feedback, and payment (CanYa Services Pty. Ltd., 2018a; CanYa Services Pty. Ltd., 2018b).

Dispute resolution management manages the work behaviors on the platform among workers and job providers regarding solving complaints among them, which usually arise as a result of false rejections of work, low wages, and low work quality (Tate et al., 2017; Howcroft & Bergvall-Kåreborn, 2018). Topcoder provides feedback to all workers (even non-winners) to let them know why their submissions were rejected or accepted [P3, P4, P7…, P10]. The platform is responsible for solving any problems between workers and job providers by negotiating with both of them. Moreover, Topcoder dedicates a forum for each project that is managed by one of Topcoder's employees, and workers can talk about their issues regarding the project within that forum [P1, P2]. For example, one worker mentioned that: "*Sometimes the project is too big in comparison with the prize. So, the workers complain about that. So, the project manager talks to the client and asks them to run the project in two challenges or increase the prize*" [P5]. In higher-level disputes, for example between co-pilots and job providers, the project manager from Topcoder takes the responsibility to try to solve the problem, as one co-pilot mentioned: "*Sometimes clients don't know what they really want. I check with them [regarding] the requirements at first, but when they receive the final submission, they say it is not what we expected. So, I talk to the project manager and he talks to them. The project manager is [the one] who solves the problem. These problems happen a lot, especially with small clients. They don't know what they really want*" [P4]. CanYa has created an automatic dispute resolution system using a chatbot. If the chatbot cannot solve the issue, the user is connected to a DAO agent who is able to provide support. At the end of the conversation, the user is able to rate the DAO agent and enhance or diminish his/her reputation score (CanYa Services Pty. Ltd., 2018b). In addition, CanYa is in the process of developing a decentralized dispute resolution system that will operate through a smart contract that holds the payment but allows both workers and job providers to take recourse and negotiate in case they are not satisfied with each other's performance. When the negotiations among parties are unsuccessful, each party can demand arbitration from CanYa DAO, as explained by a CanYa core member: "*If two parties [to a dispute] can't come to an agreement themselves, that's when they are able to call app to the DAO and then rent a member of the organization. So, the DAO member can see all the information about the parties, and the job log will be open for him/her, but s/he'll need to be quite an experienced member with our stakes*" [P20].

In sum, in centralized work coordination, the platform owner again plays a vital role in setting up the structure and mechanisms through which governance *by* the platform is done (e.g., in the layered structure of Topcoder, the project managers, co-pilots and reviewers also perform work coordination on behalf of the platform owner). Conversely, in decentralized work coordination, much of the coordination effort is coded into the platform architecture (e.g., smart contracts), thus reducing the demand for human intervention and increasing efficiency.

5 Discussion

This study explored centralized and decentralized crowdwork platform governance by investigating Topcoder and CanYa as two examples of creative crowdwork platforms with different degrees of governance centralization. We contribute to a better theoretical and practical understanding of crowdwork platform governance by delineating the mechanisms of platform control, work control and work coordination, combining the ideas of governance *of* and *by* platforms (Gillespie, 2017; Gol et al., 2019). These mechanisms allow us to distinguish between centralized and decentralized crowdwork platforms. We summarize the insights generated from our study regarding differences in centralized and decentralized governance modes in Table 3.

We hope this study can serve as a guide for both researchers and practitioners, especially platform owners, to attract more workers and job providers and, most significantly, to maintain attractiveness in the eyes of job providers and workers to guarantee continued platform success in the market. As this is an emerging field and functioning decentralized crowdwork platforms are rare, a mature case of a decentralized platform does not exist. Thus, our comparison is between a start-up and a mature platform following different business models (matchmaking vs. competition). However, we contend that the key dimensions of governance in each platform (Table 3) are comparable. While some governance characteristics (e.g., competition-based work culture) may be directly related to the respective business model, other characteristics (e.g., brokered vs. direct work agreements) theoretically make sense for both matchmaking and competition platforms. However, we show that in practice the characteristics differ based on the degree of centralization of governance.

Governance Dimensions	Centralized Platform	Decentralized Platform
Ownership	Shareholder	Community members
Management	Corporate management	Community leadership
Control	Top-down	Bilateral peer-to-peer
Work culture	Competition	Collaboration
Work agreements	Brokered	Direct (via smart contracts)
Transaction management	Intermediated	Direct (via smart contracts)
Transaction cost	High	Low
Platform service orientation	Full service	Self-service
Platforms service range	Mature full portfolio	Emergent lean portfolio
Economic model	Transaction cost economics	Tokenomics

Table 3.   *Creative Crowdwork Platforms: Juxtaposing Centralized and Decentralized Governance*

In Table 3, we highlight ten dimensions that allow for a systematic differentiation between creative crowdwork platforms based on the degree of governance centralization. Based on our study, we suggest that in decentralized governance, democracy, fairness, accountability, and self-determination can be improved by diffusing responsibilities, ownership and decision-making rights among community members

(based on Azfar et al., 2001; Brown & Grant, 2005). As shown in Table 3, ownership and management are based on community and group consent in a decentralized crowdwork platform and on top-down corporate decisions guided by shareholder interests in a centralized crowdwork platform. Governance *of* the platforms is, in both cases, conducted according to the interests of the platform owner; however, the ownership is either centralized into the hands of one corporation (e.g., Topcoder) or decentralized among a community (e.g., CanYa token holders).

Given the prominent role of the platform owner in the governance *of* the platform, it is perhaps not surprising that the owner also guides the governance done *by* the platform (i.e., how the platform controls and coordinates worker and job provider behavior). In centralized governance, a high level of control is concentrated in the hands of a few project managers and co-pilots, who oversee and monitor the progress of hundreds of workers (Brown & Grant, 2005). This tight control over process usually also leads to greater control over the quality of submissions (based on King, 1983). On the other hand, in decentralized governance, control is diffused among community members, complicating the ability to monitor all processes, as much of the monitoring is done in a peer-to-peer manner. While this may reduce misuse of power, it also increases inefficiencies in the monitoring process.

The prominent role of the platform owner – whether a corporation or a community – also translates into distinct working cultures and transaction management in the platforms. In Topcoder, the culture is based on competition, with only one winner per job (Gol et al., 2018), while the work culture in CanYa is based on collaboration among members. In centralized platforms, the platform owner plays a vital role as an intermediary to facilitate functions such as task management, dispute resolution, and contract management (based on King, 1983). In decentralized platforms, such mediation services are left to the workers and job providers themselves. Furthermore, in decentralized platforms, work agreements are created by smart contracts, enabling job providers and workers to negotiate their own prices, work conditions, and job details and to have discussions with each other regarding the job without third party intervention (Atzori, 2015). Once a smart contract is in place, transaction management is accomplished by means of following the contract coded into software (Atzori, 2015). Subsequently, because of the intermediary services in centralized governance, the transaction cost is much higher than in decentralized governance.

Despite these potential drawbacks of centralized crowdwork platforms, such platforms are more mature than decentralized crowdwork platforms, as their economic model is based on transaction cost economics, in which the nature of transactions influences the contracts and the allocation of economic functions among platform and markets (Williamson, 2008). This provides centralized platforms with a well-established economic model as a basis and allows them to invest in developing value-adding services for the workers and job providers. Meanwhile, in decentralized crowdwork platforms, the economic model is tokenomics. In this model, all users in the ecosystem are motivated to take part and receive financial benefits according to their stakes (CanYa Services Pty. Ltd., 2018a; CanYa Services Pty. Ltd., 2018b). The long-term sustainability of this economic model is unknown, but limited monetization opportunities for specific actors may hinder value-adding service development on such platforms.

6   Conclusion

In this paper, we explored how creative crowdwork platforms are governed under centralized and decentralized modes through a comparative case study. We gained a deeper insight into centralized and decentralized crowdwork platform governance by utilizing the ideas of work control and work coordination as well as exploring the platform control element as a significant distinguishing characteristic between Topcoder and CanYa. We highlight ten dimensions that allow for a systematic differentiation between centralized and decentralized governance modes. Overall, ownership and management are based on community and group consent in a decentralized crowdwork platform, whereas they are based on top-down corporate decisions guided by shareholder interests in a centralized crowdwork platform. These different ownership models translate into significant differences in both the governance *of* the platforms and the governance done *by* the platforms.

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Crowdworking: Nurturing Absorptive Capacity at the Organizational Grassroots Level

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Abstract

Crowdworking—a novel form of digitally-mediated work—allows organizations to hire on-demand highly-skilled workers and to cross national boundaries in order to bring not only new external knowledge but also new talent into organizations. Crowdworking is reshaping our understanding of knowledge transfer and open innovation. Absorptive capacity, or the organizational capability to identify, assimilate and apply new knowledge to commercial ends, is a key factor explaining how organizations become successful in creating and capturing value from external sources of knowledge. However, the extant literature on crowdworking is lagging behind in explaining how this new form of work is routinized in organizations to become an established practice that can contribute to absorptive capacity. Building on an in-depth embedded case study in a large company that uses two creative crowdwork platforms (Upwork and Proteams), we find that organizations can identify, assimilate and exploit the knowledge of talented crowdworkers via two different and complementary models of crowdworking routinization. We contribute to the theorization of crowdworking as a novel form of inbound open innovation that, when successfully routinized within an organization, becomes part of the organization and key in enhancing its absorptive capacity, providing benefits far beyond those typically ascribed to the platform or "gig" economy, such as scalability and cost-cutting.

Keywords: Crowdworking, Absorptive Capacity, Routinization, Open Innovation, Ambidextrous Organization, Future of Work

1. Introduction

Against the backdrop of volatile, uncertain, complex and ambiguous environments, organizations strive to explore new opportunities to nurture their agility and competitive edge through open innovation (Chesbrough 2003). Studies of open innovation demonstrate that the ability of firms to absorb external knowledge is the key to benefiting from open innovation (Chesbrough and Brunswicker 2014). This organizational capability to identify, assimilate and apply new knowledge to commercial ends is known as

"absorptive capacity" (Cohen and Levinthal 1990; Spithoven et al. 2010). Complementing internal capabilities with external knowledge enables firms to facilitate innovation and bolster competitiveness (Chiu et al. 2014). Thus, it is hardly surprising that organizations are continuously searching for opportunities to enhance their absorptive capacity. Crowdworking, as a new form of digitally-mediated employment, is one such opportunity with which organizations are increasingly experimenting, taking it far beyond its humble beginnings as a way to outsource routine microtasks to cheap labor on platforms like Amazon Mechanical Turk (Katz and Krueger 2019; Gol et al. 2019). However, little is known with regard to how crowdworking becomes routinized in organizations (Anya 2015) and becomes able to contribute to absorptive capacity (Chiu et al. 2014; Mattarelli et al. 2018). Deriving business value from crowdworking is a costly, time-consuming, and resource-intensive challenge (Blohm et al. 2013), which requires sophisticated routinization (Goh et al. 2011) that can handle the inherent socio-technical complexity within organizations (Anya 2015). Accordingly, this study explores how crowdworking is routinized in an organizational context and, subsequently, how the routinization of crowdworking helps organizations to identify, assimilate, and exploit new knowledge. The paper addresses the following research question: *How does crowdworking routinization contribute to absorptive capacity?*

Crowdworking refers to an innovative model of digitally-mediated employment. It involves all types of compensated work organized through online labor platforms that connect job providers and workers instantly across the world (Kittur et al. 2013). There are two key types of crowdwork: routine work (i.e., microwork) and creative work (i.e., macrowork). Routine work refers to work tasks that are accomplished in seconds or minutes. These tasks are typically repetitive, with low skill requirements and low payments (e.g., tagging pictures, filling in surveys, and data entry) (Deng et al. 2016). In contrast, creative work involves larger and more complex tasks with specialized, professional skill requirements. This type of work involves higher payment and takes a longer time to accomplish, from hours to months (e.g., web development, software and graphic design, video production, and data analysis) (Gol et al. 2019).

We address the research question through an in-depth embedded case study (Yin 2009) in a large multinational pharmaceutical company that primarily uses two creative crowdwork platforms—Upwork and Proteams—for acquiring talent and knowledge for their project, which range from medium to high

complexity. The name of the company is anonymized with the pseudonym "Pharma" to maintain confidentiality. Our findings demonstrate how organizations can identify, assimilate and exploit the knowledge of talented crowdworkers via two different crowdworking routinization models: the internal model and the external model. The internal model enhances identification through the routinization of a centralized communication structure and mediated interactions between Pharma and the crowdworkers, assimilation through the routinization of internal facilitation activities, and exploitation through informal crowdworking routinization improvement. Conversely, the external model enhances identification through the routinization of the decentralized communication structure and direct interactions between Pharma and the crowdworkers, assimilation through the routinization of employee self-service activities, and exploitation through formal crowdworking routinization improvement.

We contribute to the crowdworking and open innovation research in three ways: first, we extend the fundamental conceptualization of crowdworking and its potential benefits; second, we explain how crowdworking turns from a novelty into a routine undertaking in organizations; and third, we conceptualize crowdworking as a new form of open inbound innovation that contributes to the absorptive capacity of organizations by bringing in both new tacit and new explicit knowledge.

The remainder of this paper is structured as follows: Next, we articulate the theoretical foundations of the study and then outline the research design, including data collection and analysis methods. We then delineate our findings and discuss key insights arising from this study.

2. Theoretical Background

2.1. Crowdworking as an Inbound Open Innovation in Organizations

Open innovation refers to an organization's capability to use external knowledge to foster innovation (Chesbrough 2003). There are many ways of bringing ideas from the environment into an organization, such as using consultants and performing joint design meetings with vendors. Whereas any exchange and cooperation with entities in the environment may infuse new knowledge, relatively new approaches are

increasingly being put to use, such as crowdsourcing (Chiu et al. 2014) and crowdworking (Gol et al. 2019).

In recent years, crowdworking has emerged as a new model of digitally-mediated employment (Kittur et al. 2013; Gol et al. 2019). Crowdworking is growing fast across the world—with an estimated 26% annual growth, the number of people engaged with crowdwork platforms is expected to increase to 540 million globally over the next decade (Pew Research Centre 2016; Margaryan 2019). In both crowdworking and crowdsourcing, job providers decide to allocate specific tasks to the crowd, but crowdworking differs from crowdsourcing in a few key aspects. First, crowdworking is not based only on open calls for crowd input but also involves matchmaking—the job providers actively seek workers whose skills and experiences match the respective job requirements and then make a contract with them. Second, coordination and execution of crowdworking require dedicated digital platforms such as Upwork and Topcoder (Kittur et al. 2013; Gol et al. 2019), while crowdsourcing can be done through generic social media platforms and adapted websites (Gao et al. 2011). Third, crowdworking that involves complex projects with extensive project management requirements, such as task management, negotiation, quality control, and feedback (e.g., web development, video production), always involves co-creation between the job provider and the workers (Thuan et al., 2015). However, organizations are only beginning to explore the potential benefit of using crowdworking on a more continuous basis to co-create solutions for complex needs (Anya 2015; Durward et al. 2016; Gol et al. 2019).

Crowd-based systems' integration within organizations is highly complex due to the nature of organizational work design and configurations of work performance. These are closely intertwined into the function and structure of organizations in the traditional model, while crowdworking leverages an indeterminate group of workers without a coordinated managerial or hierarchical model (Anya 2015). Accordingly, it is essential to understand how organizations routinize crowdworking to cope with the challenges of the new work arrangement.

2.2.   Crowdworking Routinization

Routinization is key to innovations becoming an organizational success (Winter 2003; Zhu et al. 2006). Routinization refers to "*making an innovation part of the organization's regular activities, i.e., institutionalizing it*" (Buller et al. 2012, p. 357). In this paper, we focus specifically on the actions performed by organizations, platform owners and workers that result in the development of routines that establish crowdworking as an ordinary process that help to maintain organizational projects' continuity.

Regardless of the substantial promises of crowdworking, how crowdworking is routinized in organizations is still largely unclear. Research points to significant issues with coordinating the engagement and managing the work of the crowd within the constraints of current organizational structures (Anya 2015; Mattarelli et al. 2018). Moreover, most existing research on crowdworking focuses on micro-tasks, while scant attention has been paid to more complex macrowork and how to develop structures to support higher levels of innovation through crowdworking (Anya 2015; Mattarelli et al. 2018). Furthermore, little is known about the ways to best structure and manage the information provided by the crowd (Mattarelli et al. 2018), which can hinder the ability of organizations to identify, assimilate, and exploit new knowledge within the organization (Cohen and Levinthal 1990; Ahn et al. 2016). Thus, understanding the routines created around crowdworking is essential in helping organizations cultivate absorptive capacity (Vanhaverbeke et al. 2008).

2.3.   Absorptive Capacity

Absorptive capacity is the ability of an organization to examine the environment for novel opportunities and knowledge and to leverage these in its innovation process (Ahn et al. 2016). Specifically, absorptive capacity is "*the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends*" (Cohen and Levinthal 1990, p. 128). As such, absorptive capacity includes three dimensions: "*identification, assimilation and exploitation of external knowledge*" (Vanhaverbeke et al. 2008, p. 14).

The first dimension of absorptive capacity relates to a company's ability to identify and assess new external knowledge (Cohen and Levinthal 1990; Vanhaverbeke et al. 2008). The communication structure between the firm and external sources of knowledge, as well as among the firm's subunits, plays a vital role in identifying the sources of new external knowledge (Cohen and Levinthal 1990). Communication structures can either involve specialized persons to transfer knowledge from the external source or include less structured patterns (Cohen and Levinthal 1990). The communication structures could be spread across individuals or centralized (ibid). Some organizations follow strict guidelines to communicate with each other, while in other organizations people are free to decide when and with whom to communicate (Nasrallah et al. 2003). In addition to discovering new knowledge, the ability to recognize the value of this knowledge is a substantial component of identification that is necessary to trigger the absorption of such knowledge (Todorova and Durisin 2007). Cohen and Levinthal (1990) suggest that a lack of previous knowledge hinders firms' ability to assess the value of new information and can, therefore, lead to a failure to absorb it.

The second dimension of absorptive capacity relates to the company's ability to assimilate new external knowledge. Even if an organization can identify new knowledge and recognize its value, it has to have an ability to absorb and retain that knowledge (Cohen and Levinthal 1990; Vanhaverbeke et al. 2008). Assimilation enables organizations to process and internalize externally created knowledge (Zahra and George 2002). Along with assimilation, transformation is introduced as a complementary dimension of absorptive capacity that follows assimilation. It explains why and how firms are able to change their routines to absorb new knowledge that is not similar to their prior knowledge (Todorova and Durisin 2007; Zahra and George 2002). In sum, the process by which organizations absorb external knowledge may iterate between assimilation and transformation processes multiple times before new knowledge is successfully integrated into existing organizational knowledge structures and prepared for exploitation (Todorova and Durisin 2007). In this paper, we consider assimilation and transformation together and utilize the term assimilation for both.

The third dimension of absorptive capacity implies the company's ability to commercialize new external knowledge in order to achieve organizational goals (Cohen and Levinthal 1990; Vanhaverbeke et

al. 2008). The main emphasis here is on the routines that allow organizations to exploit knowledge (Zahra and George 2002). Exploitation refers to an organization's capability to harvest and integrate knowledge into its operations. It involves retrieving knowledge that has already been generated and internalized for usage. The continual creation of new knowledge is the consequence of systematic exploitation routines (Zahra and George 2002). Table 1 summarizes the three main dimensions of absorptive capacity.

Table 9. The Main Dimensions of Absorptive Capacity

Dimension of absorptive capacity	Definition	Component(s)
Identification	Identification refers to the ability of a firm to identify and assess new external knowledge (Cohen and Levinthal 1990; Vanhaverbeke et al. 2008).	*Communication* between the external source of knowledge and the organization as well as among the firm's subunits. *Recognizing the value* of new knowledge (Cohen and Levinthal 1990; Todorova and Durisin 2007).
Assimilation	Assimilation refers to the "firm's routines and processes that allow it to analyze, process, interpret, and understand the information obtained from external sources" (Zahra and George 2002, p. 189), as well as to "facilitate combining existing knowledge and the newly acquired and assimilated knowledge" (Zahra and George 2002, p. 190).	*Understanding* and *internalization* of new knowledge, including interpreting and comprehending (Zahra and George 2002; Todorova and Durisin, 2007).
Exploitation	Exploitation refers to the organizational capability "to refine, extend, and leverage existing competencies or to create new ones by incorporating acquired and transformed knowledge into its operations" (Zahra and George 2002, p. 190).	*Use* and *implementation* of new knowledge (Cohen and Levinthal 1990; Zahra and George 2002; Todorova and Durisin 2007).

Although obtaining knowledge from external sources is significant and prevalent among organizations, managing a relationship with external sources, finding the suitable persons (know-who) with the right knowledge and skills, and particularly integrating and applying the new knowledge remain considerable challenges. Internal ability and external contribution are considered complementary in addressing these challenges. Internal ability refers to the internal processes of the organization, while

external contribution refers to the boundary-crossing relationship between the organization and its partners (Nooteboom et al. 2007). Both require new routines in the organization.

Furthermore, the existence of appropriate external sources of knowledge does not mean that the inflow of new ideas and talent into the firm is a simple process. External knowledge is successfully identified, accessed and assimilated only when organizations manage to create new routines and revise their culture and organizational structure to facilitate the processes of open innovation (Vanhaverbeke et al. 2008). A comprehensive understanding of how a new work form of inbound open innovation such as crowdworking contributes to absorptive capacity thus involves a clearer understanding of these routines, mechanisms, and structures (Vanhaverbeke et al. 2008).

3. Research Design

Given that crowdworking is a contemporary and not-fully-understood phenomenon, we opted for qualitative research with the aim of expanding and building theory on organizational crowdworking. Our interest in the dynamic process by which crowdworking routinization contributes to absorptive capacity also made the choice of qualitative research particularly appropriate due to "*its sensitivity to organizational context and its potential for focusing upon activity sequences as they unfold*" (Maitlis 2005, p. 24).

We adopted the case study method to inductively build a theory grounded in empirical data (Eisenhardt 1989). We used the embedded case study approach (Yin 2009), as our case (Pharma) includes more than one unit of analysis in a single case, and the embedded design allows us to explicitly consider variations across subunits within the case (Yin 2009). The case company, Pharma, is involved with two different crowdworking platforms—Upwork and Proteams—and is putting different routines and structures in place for the two partnerships. This context provided a favorable foundation for theory building. While the embeddedness of the two units of analysis (i.e., the crowdworking platforms) in the same context of Pharma allowed for meaningful comparisons across the crowdworking routinization process and its impact on absorptive capacity, the diversity discovered in the routinization process and its impact provided a reasonable basis for generalizability.

3.1. Field Site

The study was conducted in Pharma—a large multinational organization headquartered in Europe, with approximately 42,000 employees in 80 countries across the world. This context is well suited to crowdworking research for two main reasons. First, Pharma is known for its knowledge-based excellence and relentless pursuit of innovation. Second, Pharma is one of the first mature organizations across the world to apply crowdworking at a large scale and on a continuous basis as part of its strategy to strive for knowledge-based excellence and innovation. Accordingly, Pharma has started to transfer its complex projects (e.g., web development), which used to be handled through traditional outsourcing,[18] to creative crowdwork platforms. Pharma started to use crowdworking because it provides results with the same or higher quality at a substantially lower cost and faster delivery. In September 2018, the organization developed and implemented a 'corporate crowdworking website' (CCW), which serves as a portal to direct employees to Upwork and Proteams—the two crowdworking platforms that are currently on board. Thus far, about 270 projects in different categories—mostly software development, data visualization, translation, and video making—have been completed through the two crowdwork platforms.

Upwork (founded in 2015) is a well-known and successful creative crowdwork platform with a large pool of highly skilled workers (about 12 million) located worldwide and offering various types of skilled work (e.g., development, design, translation, and accounting). Upwork collaborates with Pharma as an external crowdwork platform with no access to Pharma's internal systems. Proteams (founded in 2016) is a creative crowdwork platform with a small number of highly skilled workers (about 1400) who can help with IT projects (e.g., web development, mobile app development, data analysis, and robotic process automation). Proteams collaborates with Pharma as an internal crowdwork platform, with two of

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[18] Outsourcing refers to contracting with a service provider for the management and delivery of a predetermined work task.

Proteams project managers and a few freelance workers hosted at Pharma. Proteams also has access to Pharma's internal systems based on project requirements.

To perform projects through the crowdworking platforms, Pharma employees first open the corporate crowdworking website (CCW). They fill in a request form provided for them in the CCW, including questions such as the category of the project (e.g., software development, translation, video making), the title and description of the project, and finally the level of confidentiality ("strictly confidential", "confidential", "internal use" or "public"). Based on this information, the CCW directs the employee to a suitable crowdworking platform. For instance, if the project involves a low level of confidentiality, such as translation or e-learning projects, the employee automatically gets direct access to create an account on Upwork, where the employee can then find the best workers and make a contract with them directly. On the other hand, if the project includes confidential data, the employee gets directed to CCW administrators, who investigate which platform is best suited for this kind of project and let the employee know whether to use Upwork or Proteams. If Proteams is chosen, the CCW administrators introduce the employee to the Proteams project managers to begin negotiations about project specifications.

3.2.   Data Collection

To explore how crowdworking routinization contributes to absorptive capacity, we collected data through semi-structured interviews, participant and field observations, and casual interactions that were followed by open-ended and theory-driven thematic analysis (Bowen 2008) to gain a profound and comprehensive understanding of this emerging phenomenon (Eisenhardt 1989; Yin 2009). We conducted 37 open-ended and semi-structured interviews face to face or via Skype with the CCW team, Pharma employees, and Upwork and Proteams staff. Data were gathered over a period of six months from June to November 2019, and each interview lasted between 30 to 60 minutes. All interviews were recorded and transcribed.

Among the CCW team, we interviewed the head of the team, the purchasing manager, and the associate manager. Among Pharma employees, we interviewed those who had used the CCW to approach the crowdworking platforms for their projects. The employees were from different countries (e.g.,

Denmark, Brazil, US, China). Among the Upwork staff, we did interviews with the Upwork project manager, who was assigned to work with Pharma, and with a technical support staff member, who was available on the CCW to help Pharma employees. The staff of Upwork were located in the US, but the staff members were assigned to work with Pharma remotely. Among the Proteams staff, we interviewed the project manager who was placed at Pharma permanently (and who is also one of the co-founders of Proteams) and one of the Proteams freelance workers, who was also placed in-house at Pharma.

Additional data were collected through participation in formal meetings between the first author, CCW associate manager and CCW team, as well as a meeting between the first author, CCW team, and three professional guests regarding holding an event to showcase Pharma's utilization of crowdworking. In addition, data were gathered through informal conversations with the CCW team about crowdworking in Pharma, as well as emails and phone calls between the first author and CCW team, Upwork and Proteams staff. In addition, documents including the descriptions of the platforms, the general description of crowdworking at Pharma, sample contracts, and reports on ongoing and completed crowdworking projects were collected and examined. Finally, more than nine hours of observational data were collected, including participation in CCW team meetings with Upwork and Proteams, as well as exploration of confidential CCW content via one of Pharma's internal computers. Table 2 shows an overview of the collected data.

Table 10: Summary of Data Sources

	Pharma CCW team	Pharma employees	Upwork staff	Proteams staff
Semi-structured interviews	*6 interviews:* 1 group interview, 1 with the head of the project, 2 with the CCW manager, and 2 with the CCW associate manager	*26 interviews:* 26 Pharma employees	*2 interviews:* 1 with the project manager and 1 group interview with the project manager and online support worker	*3 interviews:* 2 with the project manager and 1 with the in-house crowdworker

Observations	*1 observation session:* Approximately 6 hours observation of CCW via company's internal computer (e.g., the content of the website, the forms to fill out by employees, the employees' comments about their experience with crowdworking, the provided learning videos, samples of employees' projects that have been done via crowdworking, etc.)	None	*1 observation session:* Approximately 1.5 hour in the formal monthly meeting between Upwork team and the CCW team of Pharma	*1 observation session:* Approximately 2 hours in the informal meeting between Proteams project managers and the CCW team of Pharma
Documentation	Emails with follow-up questions and answers after the interviews; phone call transcripts with clarifying information; help documentation; system reports	Emails with follow-up questions and answers; employees' quotes; videos on CCW; phone call transcripts with follow-up questions and answers	Emails with follow-up questions and answers after the interviews	Emails with follow-up questions and answers after the interviews; phone call transcripts with clarifying information; help documentation (e.g., platform description)
Meetings	*3 meetings:* 1 introduction with CCW associate manager; 1 introduction meeting with new members of CCW; 1 meeting with CCW team and three professional guests	None	None	None

3.3. Data Analysis

We followed the procedures delineated by Miles and Huberman (1994) to perform qualitative data analysis through data reduction and data display that led to the development of an explanation of how crowdworking routinization contributes to absorptive capacity. Preliminary data analysis was conducted during the interviews to enable iterative adjustments to interview questions in later stages, and follow-up questions were posed via email and telephone. Once data collection was complete, we coded and analyzed the data, including interview transcripts, observation notes, online quotes, and documentary evidence. In the first stage, we focused on open coding of the crowdworking routinization process (i.e., identifying

different crowdworking routinization activities) (see Appendix Table A1) and on the different dimensions of absorptive capacity at Pharma (see Appendix Table A2). We then categorized and refined the codes based on both theory and data to arrive at the key activities in the routinization process in the different units of analysis (e.g., centralized vs. decentralized communication structure, mediated vs. direct access to the pool of workers, facilitated vs. self-service project management) and key dimensions and components of absorptive capacity (e.g., assimilation dimension with internalization as a component). In the second stage, we focused on explanation building (see Figure 1), grouping different identified routinization activities together (differentiating the internal and external models) based on their contributions to the three dimensions of absorptive capacity: identification, assimilation, and exploitation.

Figure 1. Explanation Building: Internal and External Models' Contributions to Absorptive Capacity
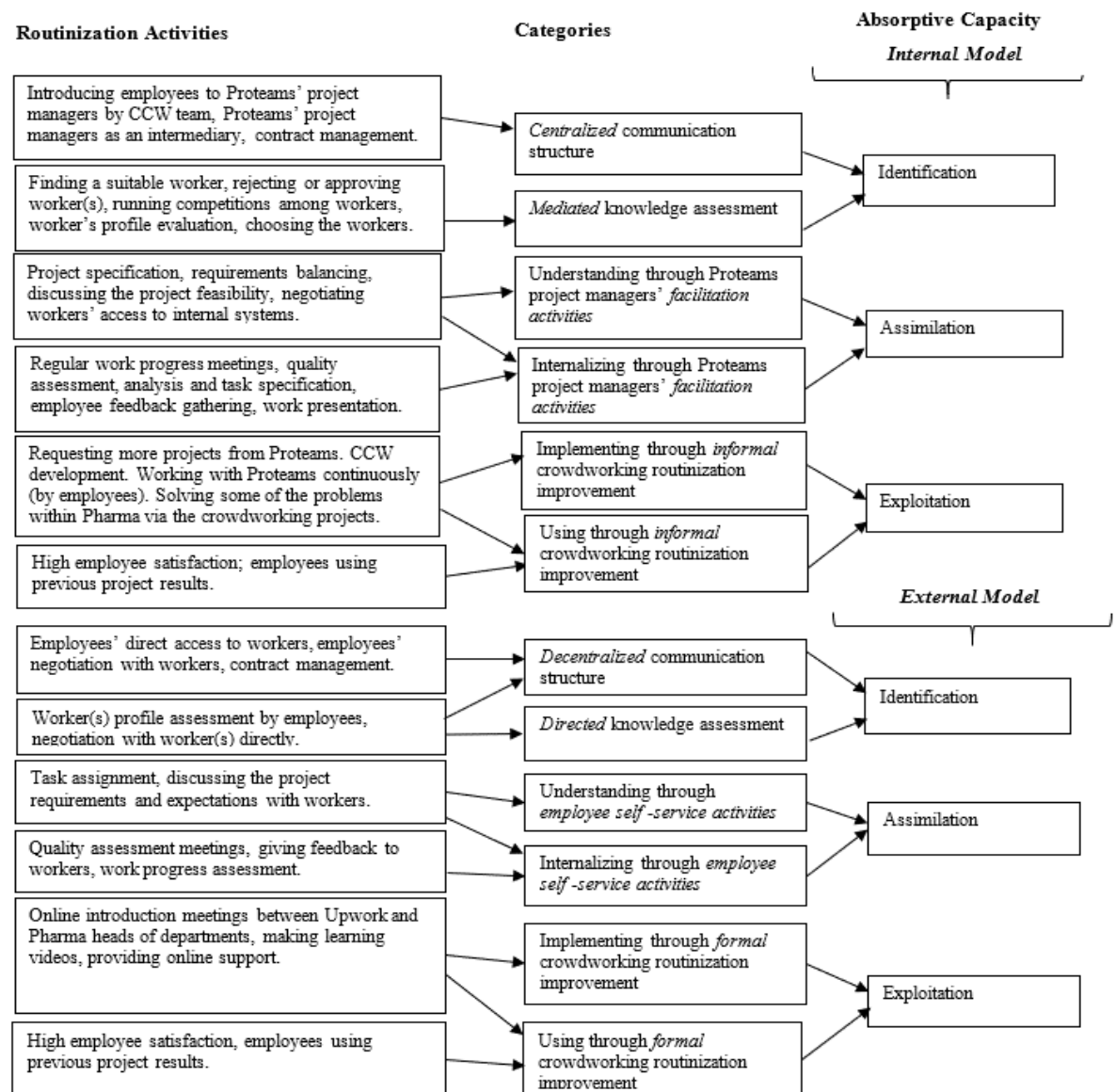
4. Findings

The findings demonstrate two successful models of crowdworking routinization that contribute to the organization's absorptive capacity in different ways: the internal model and the external model. The internal model contributes to absorptive capacity through the routinization of a centralized communication structure and mediated access to the pool of workers, facilitated project management activities, and informal crowdworking improvement activities. Conversely, the external model contributes to absorptive capacity through the routinization of a decentralized communication structure and direct access to the pool

of workers, self-service project management activities, and formal crowdworking improvement activities.

Next, we explain in detail how crowdworking is incorporated into organizational routines and how the two models of crowdworking routinization contribute differently to absorptive capacity.

4.1.　Internal Model of Crowdworking Routinization and Absorptive Capacity

In this section, we present the internal model of crowdworking routinization, where several crowdwork platform (Proteams) employees (project managers) work in-house at the organization (Pharma) to facilitate the process of hiring on-demand labor on the platform for particular projects. In our case, two of the Proteams project managers work daily at Pharma's offices on a continuous basis. In addition, there are usually around eight freelancers from the Proteams platform who work on various projects at Pharma's offices on a temporary basis. The Proteams project managers play an intermediary role between Pharma's employees and the pool of highly skilled workers on the Proteams platform. The project managers help run complex projects through facilitation activities, including creating game plans, distributing tasks, and performing quality assessments. Moreover, Proteams helps Pharma to improve the routinization of this crowdworking model over time by providing the CCW team with a monthly report showing the number of ongoing and completed crowdworking projects, cost analysis, and other KPIs of interest. They also participate in informal meetings with the CCW administrators to share ideas, gather employee feedback, talk about project progress, and promote the use of crowdworking in Pharma. The project managers and the in-house freelancers also maintain informal collegial relationships with Pharma employees.

Next, we recount how the different activities within the internal crowdworking routinization model contribute to absorptive capacity (Figure 2).

Figure 2. Internal Model of Crowdworking Routinization
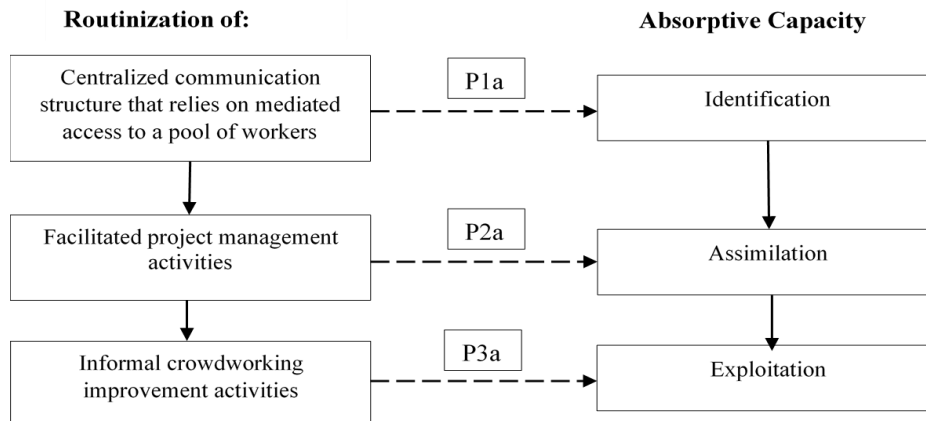
4.1.1. Internal Model of Crowdworking Routinization and Identification

Identification refers to the ability of a firm to identify and assess new external knowledge (Cohen and Levinthal 1990; Vanhaverbeke et al. 2008). This dimension of absorptive capacity is based on successful communication between the external source of knowledge and the organization and recognition of the value of external knowledge (Cohen and Levinthal 1990; Todorova and Durisin 2007; Vanhaverbeke et al. 2008). Our data demonstrate that in the internal model, it is the routinization of centralized communication as well as mediated access to the pool of workers that contribute to identification. We consider each next.

4.1.1.1. Routinization of Centralized Communication

Communication structure is one of the main components of identification and refers to the organizational guidelines for employees to communicate internally and externally (Cohen and Levinthal 1990). In the internal model, the communication structure is centralized and is achieved through the CCW team and the in-house Proteams project managers who facilitate the contracting of crowdworkers.

The foundation for the centralized communication structure is a general contract between Pharma and Proteams. The contract includes general terms and conditions, standards and rules of Pharma, special services and data protection agreements. For instance, the Proteams workers located in-house at Pharma sign the General Data Protection Regulation (GDPR) and non-disclosure agreement (NDA) once, as the first step of their collaboration. In comparison, with crowdworkers hired on a project-by-project basis and

not located in-house, the Proteams project managers ensure GDPR and NDA agreements are signed for each project. Hence, Pharma employees feel safe approaching the workers on the platform without concerns of data leakages, as one employee mentioned: *"You have [the CCW team] there working as a middleman to make sure that everything is within compliance, within the requirements… that who you get there has been assessed, has been approved to work with [Pharma], so you don't have to worry about that."* Furthermore, specific contracts for each project are signed between Pharma employees and the Proteams project managers, usually based on a fixed price for the whole project that is negotiated in the beginning, thus reducing uncertainty: *"Proteams project managers say yes, we can deliver this app for you, this will be the price—let's say 20,000 Euros. So that's the price, there's not any uncertainty about that ... whether they spend 50 hours or 200 hours doesn't matter because I've gotten a price."*

The general contract with an appropriate crowdworking platform enables the employees of Pharma to have a legitimate relationship with the external knowledge source. In addition, an operational communication structure is achieved by making project-specific contracts between the employees and the Proteams project managers that enable the employees to negotiate the budget and delivery time per project. The Proteams project managers, in turn, handle the daily interactions with the crowdworkers: *"[Pharma's employees] are rarely in contact with the worker. That's not the way of working. We are the filter and negotiate with them [the crowdworkers and the Pharma employees] to receive their insight."*

Hence, within the internal model of crowdworking routinization, communication structure is centralized in the Proteams' project managers, who take over the task of interacting with the crowdworkers. By reducing the burden of negotiating different terms and conditions as well as budget and time constraints, which are critical for the company, this routinization of centralization reduces the financial and security risks for Pharma related to identifying the best external knowledge providers (cf. Brown and Potoski 2003).

4.1.1.2. Routinization of Mediated Access to a Pool of Workers

The project managers of Proteams located in-house at Pharma not only function as a centralized communication structure but also mediate the access to a pool of workers. They assess crowdworkers' knowledge and find the worker(s) whose skills are best suited to the employee's project by investigating

172

the workers' profiles and evaluating the quality of their previous work. For instance, one of the project managers mentioned: "*When we have all the project information, we submit the description into the platform… and then the teams from our end [crowdworkers registered on the platform] can bid on the project. There might be 100 bidding for one project. We can then do the pre-scanning and reject or approve, and once we do that, we have a selection, and then we can take that selection to the client.*" Thus, within the internal model of crowdworking, external knowledge assessment – a key component of identification – is enhanced by the project managers' activities.

In sum, in the internal model of crowdworking routinization, identification of crowdworkers' knowledge is enhanced through the routinization of a centralized communication structure, which reduces the costs and risks associated with identifying new knowledge sources, and the assessment of the value of new external knowledge is enhanced through the routinization of a mediated access to the pool of workers, which helps sort out which sources to pursue. Thus, we propose that:

P1a: *The internal model of crowdworking routinization enhances identification through a centralized communication structure that relies on mediated access to a pool of workers.*

4.1.2. Internal Model of Crowdworking Routinization and Assimilation

Assimilation refers to the ability of a firm to absorb and combine new external knowledge with existing knowledge (Zahra and George 2002; Todorova and Durisin 2007). In our case, this dimension of absorptive capacity involves the routinization of understanding and internalizing the external knowledge of crowdworkers (based on Zahra and George 2002; Todorova and Durisin 2007). Our data demonstrate that, in the internal model, it is the routinization of facilitated project management activities that contribute to assimilation.

4.1.2.1. Routinization of Facilitated Project Management Activities

Understanding and internalizing new external knowledge, as the main components of assimilation, refer to the ability of an organization to interpret and comprehend obtained knowledge (Zahra and George 2002;

Todorova and Durisin 2007) and internalize that knowledge through *"the routines that facilitate combining existing knowledge and the newly acquired and assimilated knowledge"* (Zahra and George 2002, p. 190).

As is evident from the study, most of the projects that are performed through Proteams are IT-based projects, such as software development, design and development of mobile apps, and data analysis projects. These projects include a medium to high level of complexity and a high level of confidentiality due to the need to access Pharma's internal systems. The understanding and internalization of the knowledge obtained from these complex and confidential projects are enhanced by the routinization of facilitated project management activities, such as game plan, task management, and quality assessment (see Figure A1 in the Appendix), which contribute to assimilation. We elaborate on each of the three activities next.

Game Plan

In the internal model, the Proteams project managers set up one or more meetings with the Pharma employees at the beginning of their collaboration. They aim to understand the project and shape it so as to best meet the employee's target. Moreover, the project managers discuss the budget and delivery time of the project as well as required access to Pharma's internal systems for their selected crowdworkers. For instance, one of the Proteams project managers elaborated: "*I and my partner [another project manager] are typically in contact with the client [a Pharma employee] at first. So, we do the needs analysis based on the first meeting, and then we create a specification on how we understand the task and the information we need from the client… we try to understand what is feasible to do, what is not feasible, what access [to the internal system] is good to have."* Furthermore, the project managers negotiate with crowdworkers to explain the project and requirements and receive their insights, as explained by a Proteams crowdworker: "*We always try to minimize the information asymmetry by asking too many questions. So, it's better to ask twice rather than create something that is not needed or required.*"

Game plan activities increase Pharma's ability to understand and internalize new external knowledge by minimizing information asymmetry and by helping Pharma employees to comprehend what new external knowledge they need and how they can combine it with existing knowledge (formalized in

the specification document), as exemplified by the following employee comment: "*In our department, we needed to restructure [X] website completely, to make it more intuitive and lighter to navigate. With the multiple meetings [with the Proteams project managers] we got the proper consultancy on what the final product would look like and how to best solve our problem*".

Task Management

Proteams project managers divide complex projects into smaller tasks and assign those tasks to suitable crowdworkers. Moreover, the Proteams project managers coordinate the workers who are working on the same project through weekly Skype meetings, Slack channels, and sometimes face-to-face meetings. They also discuss and analyze the project with Pharma employees to help incorporate the new external knowledge of crowdworkers with the existing knowledge of Pharma's employees, as explained by one of Proteams project managers: "*We typically set up teams for each project for different tasks and assign those tasks to them…. Then, we need someone with technical understanding to combine tasks and run the project, so we add a technical expert to the team and we, as project managers, correspond and analyze the project with the [Pharma employees].*"

Task management activities increase Pharma's ability to internalize external knowledge by coordinating the crowdworkers to co-create new knowledge in a way that best meets Pharma employees' requirements, analyzing and interpreting the procedure of creating new knowledge together with Pharma employees to combine the existing knowledge with the new knowledge effectively.

Quality Assessment

Proteams project managers set up regular meetings with the crowdworkers to check on progress and the quality of work: "*In terms of quality, having the filter between the freelancer and the client gives us [project managers] an opportunity to actually review everything that's going through*." On the other hand, they set up the meetings with the Pharma employees to present the project and receive feedback to convey to the crowdworkers, as one Pharma employee noted: "*We do regular meetings to check up on how the project is going and [find out] if there are any new requests that we need to add.*"

Quality assessment activities increase Pharma's ability to understand and internalize new external knowledge by coordinating quality assessment sessions with crowdworkers and Pharma employees separately. These sessions enable the Pharma employees to comprehend new external knowledge through summary project presentations by the project managers.

In sum, in the internal model, assimilation of crowdworkers' knowledge is enhanced through the routinization of facilitated project management activities, including game plan, task management, and quality assessment. Thus, we propose that:

P2a. *The internal model of crowdworking routinization enhances assimilation through facilitated project management activities.*

4.1.3. Internal Model of Crowdworking Routinization and Exploitation

Exploitation refers to the ability of a firm to harvest and merge new external knowledge within its operations (Zahra and George 2002). Exploitation as a third dimension of absorptive capacity includes the routines that allow organizations to use and implement new knowledge (Cohen and Levinthal 1990; Zahra and George 2002; Todorova and Durisin 2007). Our data demonstrate that in internal crowdworking, it is the routinization of informal crowdworking improvement activities that contributes to exploitation. We explain how this occurs next.

4.1.3.1. Routinization of Informal Crowdworking Improvement Activities

Using and implementing new external knowledge involves the organizational capability "*to refine, extend, and leverage existing competencies or to create new ones by incorporating acquired and transformed knowledge into its operations*" (Zahra and George 2002, p. 190). In the internal model, the use and implementation of new external knowledge are achieved through the routinization of informal crowdworking improvement activities, including reporting and informal meetings as well as relationship cultivation. We consider each next.

Routinization of Reporting and Informal Meetings

The Proteams project managers provide Pharma (CCW team) with a monthly report including the amount of utilized budget, a list of the employees who used Proteams, the number and type of projects that have been completed so far, and the crowdworkers' information (e.g., name and location). Analysis of these data enables Pharma to develop and improve the CCW to be more usable and beneficial for Pharma employees: *"We have something called [CCW] dashboard which enables [Pharma] to see how much money is spent on this initiative, how much money is saved and so on. So that's how we also contribute to the development of [CCW]."* Moreover, there are regular informal meetings between the CCW administrators and the Proteams project managers. Usually, there is no specific prepared agenda at these meetings. Rather, the aim is to understand how Pharma employees benefit from crowdworking and to find ways to continuously motivate employees to use and implement new external knowledge, for example by sharing success stories: *"[The web development project] was for the resource management department, and it is used by the employees. It is used for evaluating new project requirements by the employees (for example, price). It is very fast and agile and more flexible. It triggers the creation of more projects by employees of other departments. It has improved the process of project requirement evaluation."*

Reporting and informal meetings increase Pharma's ability to use and implement new external knowledge through activities such as project analysis, idea sharing, and employees' feedback, which improve CCW. Subsequently, this improvement increases Pharma employees' engagement in crowdworking by generating more valuable and usable new knowledge via Proteams crowdworkers.

Routinization of Relationship Cultivation

Proteams engages in multiple activities to engage Pharma employees with crowdworking and motivate them to use their platform. The Proteams project managers collaborate with Pharma (CCW team) to produce crowdworking advertisement videos for Pharma employees. Moreover, the project managers and their in-house crowdworkers regularly and informally interact with Pharma employees to introduce themselves and the ideas behind crowdworking. For instance, one of the Proteams in-house crowdworkers mentioned: *"We have a direct and almost daily contact with the [Pharma employees] which of course*

changes the relationship with them. I would say that it positively affects our relationship." This relationship provides the Proteams in-house crowdworkers and project managers with a feeling of being part of Pharma's crowdworking initiative.

Relationship cultivation increases Pharma's ability to use and implement new external knowledge by fostering a positive relationship between Proteams and Pharma employees and also creating a feeling of loyalty among Proteams members. This feeling encourages the Proteams in-house crowdworkers and project managers to put additional effort into creating valuable knowledge for Pharma.

In sum, in the internal model, exploitation of new external knowledge is enhanced through the routinization of informal crowdworking improvement activities, including reporting and informal meetings as well as relationship cultivation. Thus, we propose that:

P3a. The internal model of crowdworking routinization enhances exploitation through informal crowdworking improvement activities.

4.2.   External Model of Crowdworking Routinization and Absorptive Capacity

In this section, we present the external model of crowdworking routinization, where the crowdwork platform (Upwork) is used by the organization (Pharma) to facilitate the hiring of on-demand labor for particular projects. In our case, employees of Pharma use the Upwork platform to identify and retain ancillary labor on a project basis. No Upwork crowdworkers or project managers are located in-house at Pharma. In comparison to the internal model, identification—the first dimension of absorptive capacity—is enhanced through the routinization of decentralized communication and direct access to a pool of workers. Assimilation—the second dimension of absorptive capacity—is enhanced through the routinization of employee self-service activities, and exploitation—the third dimension of absorptive capacity—is enhanced through the routinization of formal crowdworking improvement activities (see Figure 3).

Pharma employees engage with the Upwork platform when the project does not involve confidential data. Upwork is at the disposal of Pharma's employees as a self-service portal. The Pharma

employee is responsible for selecting qualified workers, negotiating and making a contract with them, and performing a quality assessment. However, Upwork helps Pharma to improve the routinization of this crowdworking model by providing Pharma's CCW team with a monthly progress report of crowdworking projects and cost analysis. They also produce tutorials, provide online support for Pharma employees, and monitor their satisfaction. Furthermore, the dedicated account manager of Upwork has occasional meetings with Pharma's department heads to explore the potential of crowdworking in their ongoing projects.

Next, we recount how the different activities within the external crowdworking routinization model contribute to absorptive capacity.

Figure 3. External Model of Crowdworking Routinization
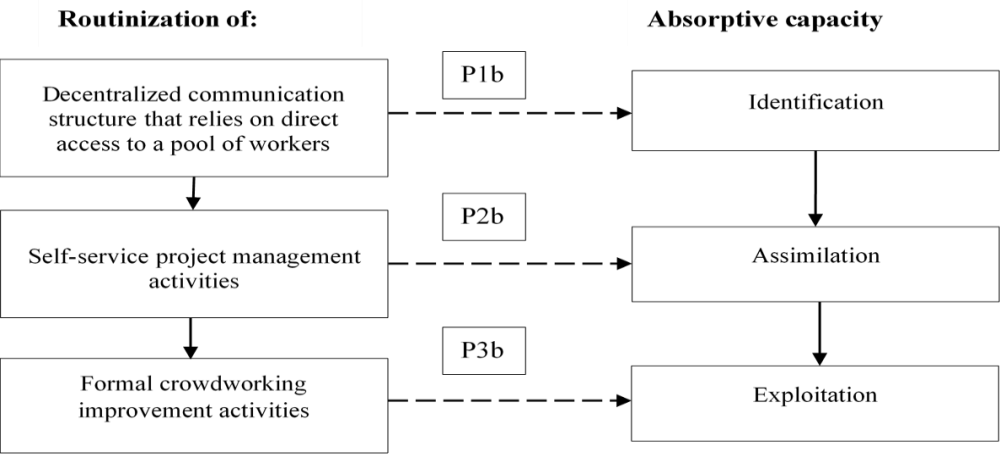
4.2.1. External Model of Crowdworking Routinization and Identification

Identification refers to the ability of a firm to identify and assess new external knowledge (Cohen and Levinthal 1990; Vanhaverbeke et al. 2008). While identification in the internal model is enhanced through the routinization of centralized communication and mediated access to the pool of workers (via Proteams project managers), in the external model it is the routinization of decentralized communication and direct access to the pool of workers that contribute to identification. We consider each next.

4.2.1.1. Routinization of Decentralized Communication

In the external model, the communication structure is decentralized and is achieved through the CCW team's and Pharma employees' activities. The foundation for the decentralized communication structure is a general contract between Pharma and Upwork. As with Proteams, the contract includes general terms and conditions as well as data protection agreements. For instance, Upwork automatically sends the rules and policies of Pharma, such as NDA and GDPR, to the crowdworkers who want to work with Pharma's employees as the first step of their collaboration: *"Every time new [crowd]workers come on, there is a guideline sheet and regulations and non-disclosure agreements. So, they sign quite a few agreements to make them aware that [Pharma] likes things done like this. These are the laws that they have to abide by. They're going to make sure that they retain the secrecy of the information, privacy, all of that. So Upwork is fully GDPR compliant."* Hence, employees feel confident in approaching Upwork, as it has the status of an officially acknowledged partner of Pharma.

Again, similar to the internal model, specific contracts are signed for each project. However, in the external model, the contract is made directly between the Pharma employee and crowdworker(s) on Upwork. Pharma employees choose the crowdworkers themselves and sign the contract with them directly, as explained by one Pharma employee: *"I opted for a freelancer with more years of experience because the price was really competitive regardless. So, I could have gotten someone for $20, but I went for someone for a little bit more."*

The general contract with an appropriate crowdworking platform enables the employees of Pharma to have a legitimate relationship with the external knowledge source. In addition, an operational communication structure is achieved through making a project-specific contract between the employees and the Upwork crowdworkers, which enables the employees to flexibly negotiate the budget, delivery time and type of contract with the workers directly.

Hence, within the external model, the communication structure is decentralized to the Pharma employees and crowdworkers during the projects. While increasing the burden of negotiating different terms and conditions as well as budget and time constraints, this decentralization also increases the flexibility for Pharma of identifying the best external knowledge providers, as explained by one Pharma

employee: "*I wanted someone who is in the US just because it makes it easier if we had to meet, be on the same time schedule and also to have no challenges with work permits if we were to do several projects together.*"

4.2.1.2.   Routinization of Direct Access to a Pool of Workers

Pharma's employees are directed to the Upwork platform after they fill in the request form on CCW and if their project neither includes confidential data nor requires access to the internal systems of Pharma. In comparison to the external model, Pharma's employees assess crowdworkers' knowledge and find the worker(s) whose skills are best suited for the project on their own. They do so by posting the job on Upwork and finding the best worker(s) among the applicants by assessing their profiles, their reputation, and the comments of former job providers. Often, Pharma employees avoid publicly posting jobs and instead seek the best workers: (a) by assessing their profile information and contacting them directly, (b) by selecting workers from an existing list of "best workers" provided by Upwork (this list is stored on CCW, and the workers are categorized according to the type of projects Pharma commonly does on Upwork, such as translations, animations, or voice recordings), or (c) by selecting workers based on their colleagues' recommendations. As explained by an employee: "*We looked at the candidates, the job success rate, how many jobs they've done, the portfolio and then we just decided on the one that we thought would be the best choice*".

Direct access to a pool of workers increases Pharma's ability to assess the value of external knowledge by decentralizing the assessment of the crowdworkers' knowledge to all involved Pharma employees (drawing on their collective wisdom to select the best workers). In sum, in the external model, identification of crowdworkers' knowledge is enhanced through the routinization of a decentralized communication structure which increases the flexibility (but also the cost and risks) of identifying new knowledge sources, and the assessment of the value of new external knowledge is enhanced through the routinization of direct access to the pool of workers, which draws on the collective wisdom of Pharma employees to perform this assessment.

Thus, we propose that:

P1b: *The external model of crowdworking routinization enhances identification through a decentralized communication structure that relies on direct access to a pool of workers.*

4.2.2. External Model of Crowdworking Routinization and Assimilation

Assimilation refers to the ability of a firm to understand and internalize new external knowledge (Zahra and George 2002; Todorova and Durisin 2007). While in the internal model assimilation is enhanced through the routinization of facilitated project management activities (via Proteams project managers), in the external model it is the routinization of employee self-service activities that contributes to assimilation.

4.2.2.1. Routinization of Employee Self-Service Activities

Most projects performed through Upwork neither involve a high level of confidentiality nor require access to the internal systems of Pharma. Therefore, the kinds of projects done via Upwork do not usually include task management, require little negotiation with crowdworkers, and can usually be done with one worker. As such, little project management is involved, and the necessary management activities related to contracting and quality assessment (see Figure A2 in the Appendix) are carried out by Pharma employees themselves. We elaborate on these employee self-service activities next.

Making a Contract

In the external model of crowdworking, Pharma employees give their requirements to the selected crowdworkers through the Upwork infrastructure, explain the project to them, and negotiate the budget and delivery time. Moreover, they discuss the project to come to a common understanding, usually via communication tools provided by Upwork or Skype. The process leading to signing a contract with a specific crowdworker is described well by Pharma employees: *"[The crowdworker] presented lots of ways of solving problems that I hadn't considered before, because I'm not a wizard in Excel … So, we agreed on that"*; *"When talking to [crowdworker] you can pretty much say: well, I want the project to look this way or I liked how you did the project for this company, can you use a similar style?"*; *"We primarily communicated via the chat in Upwork, and also we discussed and modified the contract together."*

Activities involved in making a contract serve a similar purpose to the game plan and task management in the internal model: they help Pharma with internalizing external knowledge by allowing the new knowledge co-creation process to be coordinated directly between the crowdworkers and Pharma employees. This helps Pharma employees to comprehend what new external knowledge they need and to merge it with the existing knowledge by discussing the project's requirements and its specifications. However, compared to the internal model, in the external model the overhead costs associated with internalization of new knowledge are higher for Pharma employees as they must dedicate a lot of time to project meetings, task management activities and coordination.

Quality Assessment

In the external model, Pharma employees set up one or more meetings with the crowdworker(s) to check on project progress and the quality of work, as well as to provide feedback: "*Every time [the Upwork crowdworker] produces an illustration, he will place it on frame.io, and I will see all the illustrations and comment on them. So, before he actually gets the first byte of the animation, I have already seen all the illustrations. Then we would have a meeting for some design ideas along the process where we say, 'OK, now we look at what we have so far and see if we should change something'.*"

Quality assessment activities in both the internal and external models increase Pharma's ability to understand and internalize new external knowledge. The internal model has the benefit of aiding the comprehension of new external knowledge through project managers' facilitation (i.e., they summarize the key takeaways for Pharma employees). Meanwhile, the external model has the benefit of aiding the combination of existing knowledge with new external knowledge through sharing ideas between employees and crowdworkers directly and getting employee feedback to crowdworkers directly (without having to go through project managers). In sum, in the external model, assimilation of crowdworkers' new knowledge is enhanced through the routinization of employee self-service project management activities involving direct contracting with crowdworkers and quality assessment. Thus, we posit that:

P2b: The external model of crowdworking routinization enhances assimilation through employee self-service activities.

4.2.3. External Model of Crowdworking Routinization and Exploitation

Exploitation refers to the routines that enable firms to utilize and implement new external knowledge (Cohen and Levinthal 1990; Zahra and George 2002; Todorova and Durisin 2007). In the external model, it is the routinization of formal crowdworking improvement activities that contributes to exploitation. We explain how next.

4.2.3.1. Routinization of Formal Crowdworking Improvement Activities

Our findings reveal that formal crowdworking improvement activities include reporting and formal meetings as well as learning and online support activities.

Routinization of Reporting and Formal Meetings

Similarly to the reporting done by Proteams in the internal crowdworking model, the Upwork project manager assigned to work with Pharma provides the CCW team with a monthly report showing the amount of utilized budget, a list of the employees who used Upwork, the number and types of projects that have been accomplished so far, and the crowdworkers' information (e.g., name and location). Moreover, the CCW administrators hold a monthly formal meeting with the Upwork project manager to discuss the reports and employees' feedback. It is interesting to note that, while Upwork is reserved for simpler projects with less intensive project management needs, the relationship between Upwork and Pharma is more formal than the relationship between Proteams and Pharma. This difference is largely due to the fact that Proteams is located in-house at Pharma, while Upwork is not. Regardless, reporting and both informal and formal meetings serve a similar purpose. That is, they increase Pharma's ability to use and implement new external knowledge through activities such as project analysis, idea sharing, and employee feedback, all of which improve CCW. Subsequently, this improvement increases Pharma employees' engagement in crowdworking by generating more valuable and usable new knowledge via crowdworkers.

Routinization of Learning and Online Support

The more formal relationship between Upwork and Pharma also manifests in formal learning and support activities that were not present in the internal model. For example, the Upwork project manager and his team talk with Pharma department heads via Skype on a regular basis to present themselves and the ideas behind crowdworking, as well as to train Pharma employees to use Upwork for their projects. The Upwork project manager explained: "*I talk to a lot of the [Pharma] department heads to let them know about the [crowdworking] program. I also talk with the country heads about the [crowdworking] program as well; I help get their teams on board, and then my team goes in and basically trains all of the users [Pharma employees].*" Moreover, Upwork provides learning videos on CCW for Pharma employees that demonstrate the process of posting a job on the platform, choosing workers, making a contract, and so on.

In addition, Upwork provides two dedicated remote workers to support Pharma's employees in different time zones in case they have questions or problems related to using the platform. This allows Pharma employees to learn how to work with Upwork and alleviate concerns regarding the process: "*The process of posting a job is challenging at first, but it's quite easy to pick it up, and you can contact people in the Upwork team. So, every time I have a question, I can get an answer in almost real time and feel safe.*"

The routinization of these learning and online support activities increases the ability of Pharma to use and implement new external knowledge by augmenting employee engagement in crowdworking and providing them with a feeling of comfort and safety while using Upwork. While in the internal model this feeling of safety comes from having a personal relationship with loyal Proteams project managers in-house, in the external model the feeling of safety comes from having a formal relationship with Upwork and being able to rely on their dedicated resources. Thus, we propose that:

P3b. The external model of crowdworking routinization enhances exploitation through formal crowdworking improvement activities.

5. Discussion

This paper explores how the routinization of creative crowdworking can bolster organizational absorptive capacity. We investigated the case of a large European company that has accomplished about 270

crowdworking projects over two years by successfully routinizing collaborations with two crowdwork platforms: Upwork and Proteams. The study contributes to a theoretical and practical understanding of creative crowdworking as a novel inbound open innovation that, when routinized successfully in organizations, enhances the organizational absorptive capacity.

We identified two models of crowdworking routinization in large organizations. In the internal model, communication, access to the pool of workers and project management activities are performed by project managers who play an intermediary role between Pharma employees and crowdworkers. Thus, the internal model is largely about the routinization of facilitation activities. Conversely, in the external model, communication, access to the pool of workers and project management activities are performed directly by the employees. Thus, the external model is largely about the routinization of self-service activities. The internal model is well-suited for projects with high confidentiality due to the need to have access to the organization's internal systems, while the external model is well-suited for projects with low confidentiality (the two models are compared in Table A3 in the Appendix).

Importantly, we find that both models of crowdworking routinization can enhance organizational absorptive capacity. The internal model enhances the identification of crowdworkers' knowledge by reducing the costs and risks associated with identifying and assessing new external knowledge sources – essentially, these tasks are entrusted to a partner (platform project managers), and routines are put into place to ensure they do what is best for Pharma. The external model enhances the identification of crowdworkers' knowledge by increasing the flexibility of identifying and assessing new external knowledge sources – here, tasks are entrusted to Pharma employees, and routines are put into place to ensure a smooth process and fewer overhead costs. The internal model enhances assimilation by aiding Pharma in comprehending new external knowledge through project managers' facilitation (i.e., they summarize the key takeaways for Pharma employees). Meanwhile, the external model enhances assimilation by aiding the combination of existing knowledge with new external knowledge through the sharing of ideas between employees and crowdworkers directly and getting employee feedback to crowdworkers directly. Finally, both the internal and external models enhance exploitation by creating a feeling of safety among Pharma employees, which encourages the use and implementation of new external

knowledge. While the internal model establishes a sense of safety through cultivating an informal, loyalty-oriented relationship with the crowdwork platform (Proteams), the external model establishes a sense of safety through cultivating a formal, reliability-oriented relationship with the crowdwork platform (Upwork).

Understanding the internal and external models of crowdworking routinization and their contribution to organizational absorptive capacity has three important implications: first, it extends the fundamental conceptualization of crowdworking and its potential benefits; second, it explains how crowdworking moves from being a novelty to being a routine in organizations; and, third, it helps theorize crowdworking as a new form of open inbound innovation that contributes to absorptive capacity by bringing new tacit and explicit knowledge into organizations. We consider these implications next.

5.1. Crowdworking Benefits in Organizations: Project-Routinization Model Fit

The routinization of crowdworking in a large organization paves the way for a fundamental shift in its conceptualization. Our study showcases the potential of crowdworking to be much more than a work arrangement for simple one-off projects performed by on-demand cheap labor and organized through an intermediary platform (Kittur et al. 2013; Gol et al. 2019). Routinizing crowdworking adds an organizational, value-adding layer to the work arrangement that helps to manage continuous projects aimed at drawing on-demand talent into the organization. This routinization elevates crowdworking from the status of platform-mediated gig work (Kittur et al. 2013; Gol et al. 2019) to a flexible organizational work arrangement for continuous engagement with external talent and knowledge. However, the routinization of crowdworking and its integration as an organizational, value-adding layer also requires a greater effort at managing crowdworking depending on project type. Specifically, the findings indicate that the internal model of crowdworking routinization (via facilitated management) is more appropriate for projects with a high degree of confidentiality and a high degree of complexity, while the external model of crowdworking routinization (via self-service management) is more suitable for projects with a low degree of confidentiality and a low degree of complexity (see Figure 4).

Figure 4. Project Characteristics-Crowdworking
Routinization Model Fit
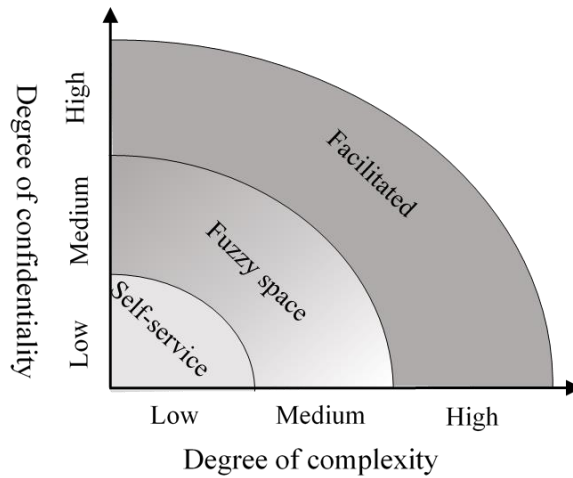
Selecting the appropriate model of routinizing and managing crowdwork, depending on the degree of confidentiality and the degree of complexity of the project, will help ensure the realization of the potential benefits of crowdworking, such as enhancing organizational absorptive capacity. It should be noted that both the degree of confidentiality and the degree of complexity of a project vary on a continuum, making the option of mixing different routinization models desirable. At Pharma, projects with a medium degree of complexity are sorted by the CCW team based on their degree of confidentiality, so that projects with more sensitive data are managed within the organization via Proteams and projects with less sensitive data are managed externally via Upwork. In other words, in Pharma, the degree of confidentiality determines whether a project is managed by the internal or external model. Another option, using a mixed-model approach, would be to allocate additional CCW team support to medium complexity Upwork projects, thereby retaining the flexibility of direct employee-crowdworker interactions while reducing the risk of project failure by aiding project coordination with CCW resources.

5.2. Crowdworking as a Routine Extension of the Workforce

A second implication of crowdworking routinization in organizations is the legitimation and institutionalization of crowdworking as an established form of work, rather than a one-off staffing solution.

Accordingly, the ancillary workers are increasingly becoming part of the organizational workforce (Mattarelli et al. 2018). As highlighted by the findings, there are different models of routinizing crowdworking in organizations with different implications for the workforce: a more centralized model (relying on having some of the crowdworkers and project managers internally in-house) and a more decentralized model (relying on employee-driven, grassroots initiatives).

The centralized model, with some internal, in-house crowdworkers, fosters a close personal relationship between the organization's employees and the crowdworkers, creating loyalty and replicating many traditional collegial dynamics that arise from sharing the same physical space (Capdevila 2015). Here, talented crowdworkers are brought physically into the organization and get hired for projects by virtue of being in the organization already. Conversely, the decentralized model, with all crowdworkers located externally on platforms, fosters a more formal relationship between the organization's employees and the crowdworkers, creating reliability and relying on networking dynamics that arise from word-of-mouth and recommendations (Mahajan et al. 1984). Here, talented crowdworkers get hired for projects again and again until they become an established extension to the organization's permanent workforce.

5.3. Bolstering Absorptive Capacity: Crowdworking as a New Form of Open Innovation

A third implication of the study is the revelation that crowdworking, when successfully routinized in an organization, can contribute to its absorptive capacity (i.e., the organization's ability to identify, assimilate and exploit new external knowledge; Cohen and Levinthal 1990; Ahn et al. 2016). We contend that crowdworking is a new way for organizations to engage with inbound open innovation (Chiu et al. 2014), given its positive effect on the identification, assimilation and exploitation of knowledge (both explicit and tacit) that is shared by the crowdworkers as they become part of the organization's workforce.

The two different routinization models incorporate the crowdworkers into the organization and draw on their talent in different ways. The internal model provides mediated access to knowledge and opportunities that are internalized through facilitated project activities and used through informal improvement activities to generate incremental innovation and value. In contrast, the external model

provides direct access to knowledge and opportunities that are internalized through self-driven project activities and used through formal improvement activities to generate incremental innovation and value (Table 3). As a result, the routinization of crowdworking as an inbound open innovation contributes to absorptive capacity through different mechanisms in the internal and external models.

Table 3: Crowdworking Routinization Models and their Contribution to Absorptive Capacity

Absorptive Capacity	Aiming	Internal Model	External Model
Identification	*Accessing knowledge and opportunities in the environment through…*	*Mediated access*	*Direct access*
Assimilation	*Comprehending and internalizing knowledge into work practices through…*	*Facilitated activities*	*Self-service activities*
Exploitation	*Using the acquired knowledge for improvement activities that generate value through…*	*Informal unstructured procedures*	*Formal structured procedures*

5.4. The Complementarity between the Internal and External Models in Support of Creativity and Innovation

It has been established that innovation requires activities that support both divergent and convergent thinking (Secundo et al. 2019). Throughout the crowdworking routinization models, divergent and convergent thinking can be continuously fostered in the organization—allowing workers to discover various directions via divergent thinking and re-focus on specific directions to follow via convergent thinking. Table 3 also shows how the internal and external models are complementary in support of innovation. Divergent processes are supported by the external model through identification and assimilation and by the internal model through exploitation. In contrast, convergent processes are supported by the internal model through identification and assimilation and by the external model through exploitation. This cross-functional relationship underscores how the internal and external models

complement one another and how both are desired for a full-blown effect of crowdworking on the ambidexterity of organizations (Gregory et al. 2015).

5.5 Practical Implications

From a practical perspective, this study helps to guide organizations in the design and routinization of creative crowdworking undertakings that, in turn, can nurture their absorptive capacity and inbound open innovation potential. The study also provides insight into how to manage crowdworking projects and when to select centralized facilitation or decentralized self-service arrangements.

This study may inspire organizations to reconsider how they rely on ancillary work to supplement their internal capabilities. In particular, the study provides compelling evidence of the benefits of crowdworking in comparison to outsourcing as a way to draw on external knowledge and resources. In addition to the economic benefits, the use of crowdworking by organizations increases the transparency of the work process and provides further flexibility in handling project requirement changes during the work process (Thuan et al. 2015).

Moreover, routinizing crowdworking provides organizations with an opportunity to contribute to sustainable development and equity distribution (Cui et al. 2019) across the world by offering job opportunities to less fortunate people who live further away from job centers.

5.6 Limitations, Challenges, and Future Research

Crowdworking is still in an emergent phase, and organizations that use crowdworking in their routine work are rare. The findings are based on data from one large case organization that utilizes creative crowdworking on a large scale. Naturally, data from additional organizations would have contributed to the validity and generalizability of the study. Furthermore, the findings are based on a case organization collaborating with two particular crowdworking platforms. Thus, it remains unclear how organizations can cope with a larger number of platforms and what would be the impact of more or different crowdworking platforms on the organization.

We generated six propositions to explain how crowdworking enhances the absorptive capacity of organizations. Further research is required to examine these propositions in additional case organizations. Further research could also investigate the impact of crowdworking routinization on the future of organizational employees' work-life and work practices. Moreover, further research is required to investigate the impact of crowdworking routinization on organization strategy, governance structures, and managerial systems.

6. Conclusion

In this paper, we explored how creative crowdworking routinization can contribute to the absorptive capacity of organizations and serve as a novel way to engage them with open inbound innovations. We showed how crowdworking could become more than gig-economy novelty and be routinized in organizations to provide an additional layer of reliable on-demand talents that can be called to action as needed. Moreover, we provided insight to guide organizations in managing projects that require professional knowledge work through crowdworking. Finally, we note that that routinizing crowdworking allows organizations to offer decent work across the globe by providing job opportunities to talented people outside their recruitment sphere.

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Appendix

Figure A1. Overview of Facilitated Project Management Activities
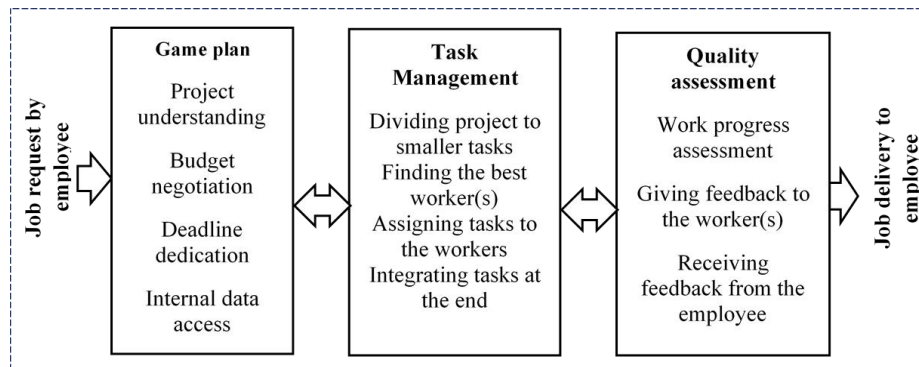
Figure A2. Overview of Self-service Project Management Activities
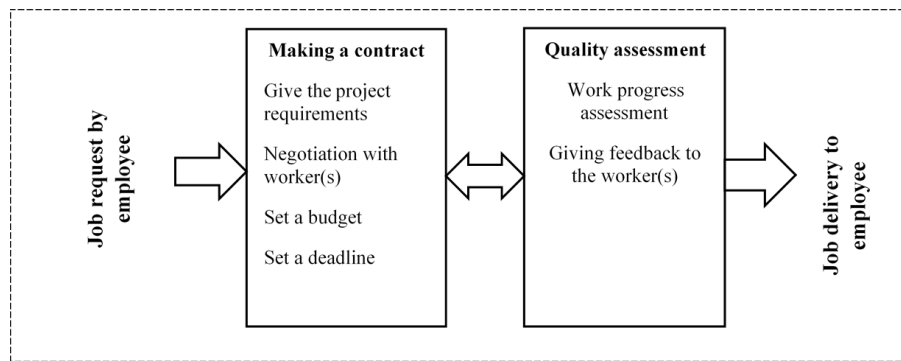
Table A1. Coding Examples for Crowdworking Routinization Process

Interview text	Data driven (underlined) and grouped codes (italic)	Emerging themes
Proteams project manager: "We and four to six of the freelancers sit here in the company….When we have all information about the project, we submit that into the platform [Proteams] with only head information, without any confidential information of course, and then the crowdworkers from our end can then bid on the project… After we find workers who meet the	Proteams 'project managers' intermediary role, finding the best worker(s) by Proteams' project managers, different agreements. Availability, in-house workers. *Mediated access to the pool of workers* *Contract management*	Comparing this passage to other passages with similar but various comments about *contract management* and *mediated access to the pool of workers*, the **centralized communication structure and mediated access to the**

requirements, we get the agreements [such as NDA and GDPR] for them to sign."

Pharma employee:
"The communication with them [Proteams' project managers and in-house workers] is quite smooth because they can be called; they are sitting in a building that is 5 minutes from us, so we can have a meeting very shortly – it doesn't take a lot of time to organize."

Availability, in-house workers.

Mediated access to the pool of workers

Pharma employee:
"They [the Proteams project managers] take care of contracts with the selected freelancers and tell them our rules and standards. We don't need to do it."

Proteams 'project managers' intermediary role, finding the best worker(s) by Proteams' project managers, different agreements, rules and standards.

Mediated access to the pool of workers
Contract management

pool of workers themes emerged.

Table A2. Coding Examples for Absorptive Capacity

Interview text	Data driven (underlined) and grouped theory driven codes (italic)	Themes from the theory
Pharma employee: "For the first application we did via Proteams – the Operetta – we were seeing development of the application every week. So, it is easy to receive an app, and we click on the button to see whether that's what we want and if we asked for any changes to see if [the worker] has done them or not. Concerning the second project with Tableau via Proteams, it was also easy to see what they [crowdworkers] have done in the meetings [with Proteams project managers]. So, it's very thorough work, to check all the time if it works and if it doesn't work."	Regular work progress meetings, work presentation, employee feedback gathering, quality assessment. *Internalizing*	Contrasting this passage to other passages with similar but different comments about *internalizing* and *understanding* of new knowledge, the **assimilation** theme from the theory of absorptive capacity was

<u>Pharma employee</u>
"I had a project where I needed to do a dashboard... So, I called the [Proteams project manager] for a meeting, sat down for half an hour and went through it; I said I want it like this and this. It was drawings more or less to show how it looks, and I said please drag this data and use these filters and so on, and the person was very knowledgeable, so he took it and we analyzed it together and examined if it works. We also talked about which internal systems the workers should have access to… After that we had maybe two or three touch bases, but he was like, 'OK, this is the quality – do you want me to do this', and he showed me. I said modify this or that and it was done in maybe two weeks."

<u>Project specification, requirement balancing, discussing the project feasibility.</u>

Understanding

<u>Regular work progress meetings, work presentation, employee feedback gathering, quality assessment.</u>

Internalizing

confirmed and refined.

Table A3: Juxtaposing Internal and External Crowdworking Routinization Models

Dimension	Internal Model of Routinization	External Model of Routinization
Access to pool of workers	Mediated access.	Direct access.
Communication structure	Centralized. The project manager signs the agreements as an intermediary between the workers and employees.	Decentralized. Agreements are signed directly between the workers and employees.
Project management	Through facilitation activities by Proteams' project managers.	Through employee self-service activities.
Crowdwork routinization improvement	Reporting and informal meetings, cultivating a relationship with Pharma's employees.	Reporting, formal meetings, training employees, online support.
Confidentiality	Supporting projects with high confidentiality via access to Pharma's internal systems.	Supporting projects with low confidentiality without need to access Pharma's internal systems.

5.   Research Paper 4

Organizing Work on Creative Crowdwork Platforms: A Practice Perspective

Author: Elham Shafiei Gol

ABSTRACT. The world of work is changing fast with the increasing popularity of platform-mediated work. Despite platform workers being the fastest growing segment in the alternative workforce, there is little known about how work is organized on gig economy platforms that operate under conditions of employment, scheduling and location flexibility. This paper explores how work is organized on crowdwork platforms with Topcoder serving as a case of a successful platform. Our findings demonstrate that professional socialization and career development are the main practices that organize employment relationship flexibility; time, budget, and task management are the main practices that organize scheduling flexibility; and virtual communication and cultivating work friendships are the main practices that organize location flexibility. Furthermore, we find that the combination of these practices can generate psychological safety for both workers and job providers, despite the usual risks involved in the gig and crowdwork arrangements.

INTRODUCTION

Organization and design of work have been on the agenda of IS scholars since the 1950's Tavistock studies that advocated for the joint optimization of the social and technical sub-systems at work (Trist and Bamforth, 1951). Since then, we have learned quite a lot about how traditional work is organized (Hackman, 1980; Spreitzer et al., 2017; Winter et al., 2014). However, the world of work is changing rapidly with the proliferation of advanced information technologies (Barley et al., 2017; Forman et al., 2014). One key area of change is the increasing popularity of platform-mediated work, otherwise also known as crowdwork and the gig economy (Mulcahy, 2016). Platform-mediated work is the fastest growing segment in the alternative workforce (Katz and Krueger, 2019), and research on the topic is flourishing (Ashford et al., 2018; Kuhn and Maleki, 2017; Petriglieri et al., 2019).

So far, much effort has gone into understanding the workers, for example their identities (Bellesia et al., 2018; Petriglieri et al., 2019), their behaviors and capabilities (Ashford et al., 2018; Daniel et al., 2018; Kuhn and Galloway, 2019), as well as the algorithmic management of workers on platforms (Wood et al.,

2019). However, there is little discussion beyond anecdotal evidence as how work is organized and practiced on a daily basis on these platforms. We address this void by offering an empirical examination of paid, online crowdwork as a new model of work arrangement organized via online platforms such as Amazon Mechanical Turk (AMT), Crowdflower, Upwork and Topcoder (Kittur et al., 2013).

Crowdworking is growing fast through connecting workers and job providers instantaneously across the world and different time zones as well as providing self-employment opportunity and an increasing sense of autonomy for workers (Spreitzer et al., 2017; Gol et al., 2018). Crowdworking helps job providers to harvest knowledge, skills, and innovation from an extensive and anonymous crowd in a flexible and cost-effective manner (Tate et al., 2017; Gol et al., 2019). Broadly, there are two types of crowdwork projects: those involving routine and micro tasks, which are usually repetitive with low level of skill necessity, minimal payment, and very short time frames (e.g., tagging pictures) (Deng et al., 2016); and those involving more creative, complex, professional, and long-term tasks such as graphic design and web development with higher payment for workers (Margaryan, 2016; Gol et al., 2018). In this paper, we focus on the latter, which we call creative crowdwork, as it requires elaborated information processing activities such as data collection, task design, ideation, solution finding, and teamwork (Thuan et al., 2015) and thus, also requires intricate organization that can handle the inherent socio-technical complexity.

So far, most of the research on crowdwork has focused on the macro and meso perspectives, including studying labor market conditions in the gig economy (De Stefano, 2016), and the perspectives of workers, platform owners, and job providers, especially on routine platforms like AMT (Brabham, 2010; Kittur et al., 2013; Deng et al., 2016; Gol et al., 2019). We know how crowdwork platforms are governed via control and coordination mechanisms under different degrees of governance centralization and work routinization (Gol et al., 2019). In addition, the few studies from the micro perspective focus on issues such as job crafting (Tims and Bakker, 2010) and redesign of work (Deng and Joshi, 2013) where workers try to revise the social environment and work meaning to improve their job conditions. However, we do not know how the structures of work organization are formed and shaped through the combined practices of workers, platform owner(s), and job providers.

In general, crowdwork, as a platform-mediated type of work, offers flexibility in three dimensions: (a) flexibility in the employment relationship, (b) flexibility in the scheduling of work, and (c) flexibility in where work is accomplished (Spreitzer et al., 2017, p. 1). This enhanced flexibility is attractive to job providers because it provides economic benefits, which in turn, motivate them to hire more contract workers rather than full-time workers (Davis, 2016; Bidwell, 2009). For instance, in 2015, 9.7 million workers from more than 180 countries had registered to perform different tasks for 4 million job providers on crowdworking platforms (Boudreau et al., 2015). At the same time, such flexibility is difficult to manage, especially in creative crowdwork with its various complex projects (Thuan et al., 2015).

As the number of crowdworkers is growing fast (Spreitzer et al., 2017), research is needed to understand how work organization is achieved through the interweaving and combined practices of platform owner, job providers, and workers. Accordingly, this paper poses the following research question: *how is work organized on creative crowdwork platforms?* Building on the practice perspective (Whittington, 2003; Nicolini, 2012), we explore how work is organized and conducted in platform mediated contracting gig work (Spreitzer et al., 2017) that relies heavily on flexibility.

Subsequently, we use Topcoder as a case company to study the underlying phenomenon. Topcoder (founded in 2001) is a well-known and very successful creative crowdwork platform which acts as an intermediary between job providers and highly skilled computer programmers and designers. Our findings demonstrate that professional socialization and career development are the main practices that organize employment relationship flexibility; time, budget, and task management are the main practices that organize scheduling flexibility; and virtual communication as well as cultivating work friendships are the main practices that organize location flexibility. Interestingly, our findings show that, *together,* these practices can generate psychological safety for everyone involved, despite the usual risks involved in the gig and crowdwork arrangements for both workers and job providers (Gol et al., 2018).

The remainder of this paper is organized as follows: First, we articulate the theoretical foundations of this study by presenting the practice perspective for examining work and the concepts of creative crowdwork and flexibility as the focal points of our investigation. Next, we outline the research design,

consisting of data collection and analysis methods, followed by the findings. Finally, we discuss the practical and theoretical implications of this research.

THEORETICAL BACKGROUND

Studying work (Barley and Kunda, 2001) plays an important role in Information Systems (IS) and associated fields. The main characteristic in studying work is to examine work from the perspective of those who accomplish it in order to "systematically investigate the concrete activities that constitute the routines of organizing" (Barley and Kunda, 2001, p. 84). Practice perspective involves a set of frameworks and ideas to investigate real activities and their emerging consequences instead of abstract entities (Stein et al., 2015). The practice notion implies close attention to the work done by people inside organizational processes (Whittington, 2003, p. 2).

The practice notion is explained in multiple ways, but a mutual thread is a comprehension of the skill through which individuals work with the existing resources in their everyday life (Whittington, 2003). Interpreted for the purpose of the study of work, practice perspective tends to investigate the "doing" of work (work*ing*), instead of such abstract subjects as "work role" or "my job", which are seen to emerge from the doing of work. Specifically, "*practices perform meaning and support identity, so that the question of what people and things are depends upon the practices in which they are involved*" (Nicolini, 2007, p. 893).

From this perspective, work organization as "the *way work is structured, distributed, processed and supervised*" (Carayon and Smith, 2000, p. 1) is achieved through concrete practices of e.g., work scheduling (e.g. setting work hours, break- and other time schedules), work design (e.g. matching required skills to task complexity), work relationship development (e.g. relationships with colleagues or boss), management of teamwork, career advancement (e.g. creating development opportunities), and established organizational ways of doing things (e.g. communication and culture) (Carayon and Smith, 2000).

Flexibility is a significant factor that distinguishes crowdwork from traditional work as it enables workers to have control over how, when and where the work is performed (Spreitzer et al., 2017; Gol et al., 2019).

According to Spreitzer et al. (2017), there are three dimensions of flexibility in alternative work arrangements such as crowdwork. The first dimension is *flexibility in employment relationship*, which refers to short-term work assignments. Contract workers (incl. crowdworkers) are usually employed to perform a short-term project related to their knowledge and skills (Spreitzer et al., 2017). Instead of a guaranteed monthly salary, they are compensated per hour or on a project basis that a job provider has specified in a contract (Gol et al., 2018). High-skilled crowdworkers are often referred to as freelancers who are able to perform complex projects on creative or open innovation platforms such as Upwork, Topcoder or Innocentive. This includes, for instance, writers, engineers, film producers or software developers. The second dimension is *flexibility in scheduling of work* which refers to workers having control over working hours (Spreitzer et al., 2017).

Crowdworkers usually have substantial schedule flexibility, specifically in relation to when they decide to apply for a new project. For instance, many high-skilled crowdworkers take time off after a big project and before starting a new one. Having control over the timing of work and breaks has significant positive implications for recovery from work exhaustion (Spreitzer et al., 2017). The third dimension is *flexibility in the location of work* which refers to having control over choosing the place of doing a job (incl. away from the job provider or employer) (Spreitzer et al., 2017; Gol et al., 2018). Platform-mediated contracting, such as in creative crowdwork, involves all three flexibility dimensions. Yet, most of the research regarding the flexibility in scheduling and location has been accomplished exclusively on full-time employees with little attention to whether and how the results may apply to contract workers who operate under more risky employment conditions (Spreitzer et al., 2017).

The organization of work under these three dimensions of flexibility is an interesting challenge because it becomes necessary to organize work in a way that reinforces and, at the same time, manages these dimensions of flexibility. Based on the practice perspective, we assume that work organization is not achieved just by the actions of the platform owner(s), but also the everyday activities of the workers themselves and the job providers. Therefore, in order to understand how to organize work under conditions of the flexible employment relationship, flexible schedule, and flexible location, we need to study how the

platform owner, job providers and workers all perform certain activities, which together make work under these flexible dimensions possible. Thus, this paper aims to investigate how work is organized through the combined practices of platform owners, workers, and job providers under the three dimensions of flexibility.

RESEARCH DESIGN

Given our interest in how work is organized in practice on creative crowdwork platforms, we used a case study approach that allowed us to gain a comprehensive and profound view of this emerging phenomenon (Eisenhardt, 1989; Walsham, 1995). According to Eisenhardt (1989), the case study approach is useful if "*little is known about a phenomenon, current perspectives seem inadequate because they have little empirical substantiation, or they conflict with each other or common sense*" (p. 548).

Thus, as crowdworking is still in early stages of development and organizing platform mediated gig work is still unexplored, especially when it comes to more complex creative work, the case study approach offers a suitable research method for the present study. This study was accomplished on the Topcoder platform which is a well-known and successful creative crowdwork platform and partners with important agencies, crowdsourcing ecosystem corporations, and consultancies across the world such as TC3[19] and Appirio[20].

There are around 100 companies and enterprises such as Google, IBM, and NASA that rely on Topcoder for having access to hard-to-find skills[21]. The platform included 1.2 million high-skilled freelancers in December 2017, and this figure is reportedly growing by a rate of 50,000 computer engineers in each quarter (Talley, 2017). Topcoder runs online software design competitions (such as idea generation, application and web design, concept and icon design), software development competitions (such as Bug Bash, which refers to challenges that fix bugs in specified software products; First to Finish, which refers

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[19] TC3 is a Japanese company with a focus on the Japanese market. TC3 team are knowledgeable in crowdsourcing and open innovations.

[20] Appirio is an American company with a focus on the design and development of next-generation worker and client experiences using crowd, cloud and solution accelerators.

[21] Information retrieved from https://www.topcoder.com.

to rapid software development, quality assurance with focus on testing the software products, and UI prototype which refers to front-end development), data science competitions (such as data visualization and data science ideation), and competitive programming events (based on Topcoder website and Archak, 2010).

Data Collection

With the aim to explore how work is organized on creative crowdwork platforms, we were interested to study the dynamics among workers, platform owners and job providers which make the three dimensions of flexibility possible. Therefore, data were collected through 42 open-ended and semi-structured Skype interviews with Topcoder staff, workers and job providers, that were conducted from February to September 2018. Each interview lasted between 40 to 50 minutes. Furthermore, data were collected from Topcoder's forums, their Slack community channel (used by workers and staff), and the platform website.

The interviews were conducted with workers with a focus on two groups: experts (including co-pilots and reviewers) and competitors (see Table 1), who were from different countries (e.g., Chile, Indonesia, Greece, India). In addition, we did interviews with platform staff and used secondary data in the form of short interviews with platform staff provided on Topcoder website. The staff had different roles on the platform (e.g., project manager, community manager, creative director, product designer). Further, we also performed interviews with a few job providers. Finally, we observed and studied the communications and interactions among workers, staff, and job providers on different public Slack channels and Topcoder forums.

The anonymity of job providers and workers on Topcoder posed some limitations in our data collection. We used LinkedIn to find prospective interviewees where many workers specify their contributions on Topcoder on their profiles. We continued this research and employed snowball sampling and used recommendations of prior interviewees to reach out to workers with various attitudes and genders. Detailed information related to the interviewees is presented in Table 1.

Table XI. Overview of interviewees

Interviewee Category	Number of Interviews	Roles	Areas of Expertise
Worker	23 [P1…P23]	Competitor, Co-pilot, Reviewer	Development, Design and data science, Programming
Staff	16 [P24… P39]	Project manager, Community manager, Product design, Information architect, Software architect, Platform architect, Creative director, Event organizer	Development, Community, Design and data science, Programming
Job provider	3 [P40… P42]	Private company hiring workers through Topcoder	Software design and development, UI prototype

Data Analysis

All interviews were recorded and transcribed. To ensure that nonverbal aspects were considered as well, we took notes throughout the interviews. Field observation notes were taken during observing the interactions and communications among workers, staff and job providers on public Slack channels and online forums. We conducted iterative coding of the interviews, online data, and observation notes, primarily using open coding and further by classifying and revising the codes according to both data and theory. We coded for the three dimensions of flexibility, as recommended both by the literature and the data exploration.

We then focused on identifying the practices that helped reinforce and manage these three dimensions of flexibility, such as professional socialization, career development, time management, budget management, task management, virtual communication, and workplace friendship as shown in Table 2. We assembled the codes based on different dimensions of flexibility to identify the most effective way of organizing our findings. This process helped us to explore and document the specific practices done by workers, job provider and platform owner and their interweaving.

Table XII. Analysis process

Theme	Codes	Identified Practices
Employment relationship flexibility	e.g., Contract, employment, part-time, full-time, feel free, control, rule, learn, support, community, beginner, competitor, novice.	Professional socialization
	e.g., Role, copilot, reviewer, experienced worker, promotion, grow, skill, feedback, win.	Career development
Scheduling flexibility	e.g., Time, schedule, control, night, day, break, travel, part-time, full-time, submission.	Time management
	e.g., Project, price, monetization, budget, award, financial issue.	Budget management
	e.g., Challenge, complex, task, design, divide, small task, coordination.	Task management
Location flexibility	e.g., Time zone, control, place, location, country, home, remote, copilot, reviewer, project manager, client, worker, competitor, communicate, discussion, consult, issue.	Virtual communications
	e.g., Relationship, talk, chat, friend, lonely, alone, solitary.	Workplace friendship

FINDINGS

In this section, building on the data analysis, we describe the key practices involved in shaping and managing flexibility in employment relationship, scheduling, and location of work on a creative crowdwork platform based on the case of Topcoder.

Flexibility in Employment Relationship

Flexibility in employment relationship refers to the temporary contract between an employee and a job provider. Flexibility in employment relationship plays a key role in the business model of crowdworking platforms that virtually broker between highly-skilled freelancers and interested job providers. On many crowdwork platforms (e.g., AMT and Upwork), workers report feeling marginalized and powerless due to lack of official employment status (Deng et al., 2016). Interestingly, we find that most of the workers on Topcoder were satisfied to be self-employed (Gol et al., 2018).

We found that a considerable number of workers on Topcoder left their traditional jobs and became contract workers on Topcoder because they preferred a more flexible work arrangement, as portrayed by the following statements: *"Want to be free? Join Topcoder"* [P16]; *"I work as a freelance programmer and have the luxury of choosing which jobs I take. I usually pick those that I find interesting"* [P11]. This led us to investigate further how the flexibility in employment relationship is formed and managed in practice. We found that professional socialization and career development are the main practices that shape employment relationship flexibility on Topcoder.

Professional socialization. As crowdworkers do not work for one specific organization (instead they flexibly move between short-term employment contracts mediated by Topcoder), there is little traditional organizational socialization (Van Maanen, 1977) that helps workers find a place where they belong and a supportive environment. However, while crowdwork provides freedom from the iron cage of traditional employment, freelancers still yearn for a place to belong and a supportive environment (Petriglieri et al., 2019).

We find that in Topcoder this is achieved through the practice of professional socialization, which reinforces the values and norms of flexible employment, but manages the balance between the flexibility (and uncertainty) that comes from short-term contracting and the stability that comes from long-term professional networks. Professional socialization is defined as *the process of internalizing and developing professional identity through the acquisition of knowledge, skills, attitudes, beliefs, values, norms, and*

ethical standards in order to fulfill a professional role" (Dinmohammadi, et al., 2013, p.1). Topcoder contributes to professional socialization in different ways, such as Topcoder blog, forums, help articles, learning competitions, and information which are available on their website for new competitors.

First, Topcoder runs learning competitions for beginners, as described by one of its employees: "*We run to learn and practice challenges on Topcoder, they don't award you any money, but they help you learn about the technology*" [P28]. Second, Slack channels are provided for both novices and experts to ask questions; and different channels exist for design, development, data science and other areas of professional expertise [P2...P5, P7, P9...P12, P17...P20].

These channels, while maintained by Topcoder, allow workers to help each other to develop their professional knowledge and skills through discussion and tip sharing, as highlighted in the following quotes: "*I think Topcoder is the community of really talented people. I remember that I immensely enjoyed reading posts on Round Tables (Topcoder forums). I think one of the keys to success is listening to your community*" [P15]; "*Topcoder community brings many of the world's best talent together in one place to compete, collaborate and learn from one another. While competition is core to everything we do, it's our collaborative community atmosphere that makes Topcoder special. We compete together to make us all better practitioners of the technology we love; that is how Topcoder motivates me*" [P2].

Third, Topcoder has explicitly assigned employees for managing the community channels to keep them up to date and for paying attention to workers' requirements, as explained by a senior community evangelist: "*My job is interacting with the community members personally and getting to know them: what they are doing, where they are facing issues…*" [P24]. He added: "*I am learning every day to become better (at least, I hope so) and keep the community happy and make the members more productive. The most challenging thing is to try and take everyone's opinions and ideas into account. Sometimes there are members with different viewpoints. So, I try and interact with the community more and more to know what they need and how I can help them out*" [P24].

In sum, it is clear that the practice of professional socialization relies on the daily efforts of both the workers and the platform owner. The platform owner provides and manages the infrastructure (e.g., virtual

channels, blog, forums) and creates an attractive supportive environment (through assigned community evangelists) that motivate workers to join the community and help each other. The workers, then, reinforce the community atmosphere that brings together top freelance technical talent to become even better practitioners that have the luxury to pick and choose the jobs they want (Spreitzer et al., 2017).

Career development. Another considerable challenge that burgeons from the gig working where crowdworkers do not belong to one specific organization is lack of promotion opportunities within their workplace (Spreitzer et al., 2017). While crowdworkers have higher autonomy and free choice in contrast with traditional employees, they bare personal responsibility to remain employable and competitive and must deal with less formal rights and more uncertainty in contrast with traditional workers (Lo Presti et al., 2018). Therefore, they yearn to have growth opportunities that motivate them intrinsically to keep working as freelancers on crowdworking platforms (Gol et al., 2018). We detect that in Topcoder this is achieved through the practice of career development, which augments the values and norms of flexible employment by managing the balance between the boundaryless career (Briscoe et al., 2006) and the traditional career path.

The boundaryless career refers to "*both objective and subjective dimensions of career at multiple levels of analysis, including organizational position, mobility, flexibility, the work environment, and the opportunity structure while at the same time de-emphasizing reliance on organizational promotions and career paths*" (Briscoe et al., 2006, p. 2). Topcoder contributes to career development through different ways such as providing promotion opportunities as well as self-driven skill growing opportunities.

First, we observed that freelance workers who acquire a substantial number of "wins" in Topcoder are often offered something akin to a traditional promotion opportunity and can become "copilots" or "reviewers" within the platform. The copilot has the responsibility to run challenges on the platform, including communicating with the job providers, designing job specifications, and responding to the workers' questions, as explained by one Topcoder manager: "*basically one of those members who has worked on many challenges and has a knack for writing specifications, clearly understanding what is part*

of a challenge, we tend to promote him as a copilot" [P27]. Meanwhile, the reviewer role includes assessing workers' submissions and selecting the winners of a challenge: "*you as a member become a reviewer, if you have the skill set of reviewing challenges and if I have done challenges in required technologies 50-55 times*" [P29].

Further, self-driven skill growing opportunity is provided for workers through receiving feedback from reviewers in each challenge to give them a chance to distinguish their weaknesses and reasons for their failure and try to improve their skills and grow in their career, as highlighted in the following quotes: "*I was able to submit; it wasn't the best submission, but I will learn (from receiving feedback) why and next time my submission will be better and perhaps I'll begin succeeding*" [P2]; "*It's easy to design something that "looks cool", but it's something totally different than designing something that solves a problem. This is something that comes with experience and feedback*" [P10].

Topcoder has explicitly assigned employees for managing the copilots and reviewers to control the quality of their work, as explained by an architect manager: "*If copilots don't have a passing submission, they don't get paid. It's rare. Typically, what that means is they run the challenge and they put more money, or they make the duration longer. Probably the one thing you don't know that we do a lot is we do private tasks in private challenges that sometimes the copilots do themselves, sometimes other members do, sometimes we give the copilot the ability. Sometimes the copilot will do that and feel like that is part of their copilot payment, sometimes it will be something bigger and we will offer to pay them for that specific task, where sometimes we will give them the option to have another member do it as a specific task and give them the ability to pay directly*" [P26] and following that, one of the copilots mentioned: "*If I don't manage to complete the project… I'm not sure because it never happened to me. But if you fail to run a project, you won't get another one*" [P4].

Thus, the practice of career development, similarly to professional socialization relies on the daily efforts of both the workers and the platform owner. The platform owner provides the promotion roles (e.g., copilots and reviewers) and manages these roles (e.g., through assigned project managers) to keep the quality of work high. The workers who got a promotion, then, through assessing the participants'

212

submissions, provide them feedback to help them grow their skills and increase their chance to win the competitions and get a promotion within the platform.

Flexibility in Scheduling of Work

Flexibility in scheduling of work refers to the control that workers have over their working hours and the schedule of work. Flexibility in scheduling and control over workload are among the key benefits of gig working (Zheng et al., 2011). Abandoning the traditional 9-5 workday model on crowdwork platforms (Nansen et al., 2010) makes crowdworkers satisfied through increasing the sense of autonomy (Gol et al., 2018). We found that a substantial number of workers on Topcoder were pleased to have control over their work time as highlighted by the following statements: "*I'm my manager. I have control over my time. I am able to choose working in the day or the night or during vacations*" [P7]; *"These were the times when I spent most of my free time with programming competitions. It may sound weird, I admit, a guy spends 8 hours of work with computers and does the same during commuting and also in his leisure time*" [P11].

Although it is known that the flexibility in scheduling can increase the satisfaction of workers, it is not clear how such flexibility is shaped and managed to avoid burnout and exhaustion. This led us to investigate further how the flexibility in scheduling is formed and managed in practice. We found that in Topcoder it is accomplished through a combination of practices of **time management, budget management, and task management.** Together, these practices balance the values and norms of flexible scheduling (Halpern, 2005) with the clarity and predictability that comes from traditional work scheduling.

Time management is the process of scheduling and planning mindful control of time spent on specific activities, particularly to improve productivity, efficiency, and effectiveness (Cottrell, 2013). Budget management is a process of financial planning for a specified period including planned incomes, costs and expenses, assets, resource amounts, obligations, and cash flows (based on Sullivan and Sheffrin, 2003), and task management refers to the management and organization of interdependencies among tasks (Kittur et al., 2013).

As crowdworkers do not work specific hours like traditional workers (Spreitzer et l., 2017), managing time is difficult on gig working platforms, especially when there are workers who have a full-time job "on the side", as explained by one of the workers: *"that is a critical issue for me, and I guess for everyone who has a full-time regular job and wants to compete. What I try to do is to improve the "usage quality" of my time when I am working in a marathon, i.e., avoid just sitting in front of the computer and watch it running thousands of tests (as I already did in the past when I had more free time). Now I usually have few (1~8) hours during the night to work (plus part of the weekends). During these hours, I try to implement the most promising ideas, in a more or less organized way, and schedule longer tests batches to run when I am sleeping, at work, etc. Another thing that I often do is to prepare different versions of my solution, so even without working on the problem, I can still make a few submissions when I am busy"* [P12].

Topcoder contributes to time management through the practices associated with specific roles on the platform, such as project managers and copilots, who have the responsibility to design the work and run the challenges in an optimal way in terms of time, budget and task design. For instance, for the software development projects, the project manager decides which technologies and skills are required for the new project and which copilot is suitable and has enough skills to run the new challenge.

The copilots, as expert workers, usually decide about the budget, scheduling, and design of the challenge as one of them described: *"It should be you who estimates the costs and schedule, not the client. I never commit to a task before fully understanding what the scope is. It's ok if some of the details are unclear but you should have a more or less correct understanding of what exactly you want to achieve and how"* [P3]. The main tasks of copilots include discussions with job providers to understand their project and shape it in the way that would be possible to run on the crowdwork platform. In addition, writing the project specifications, designing the training phase, testing the solutions, creating the online scoring application, and generating a visualizer tool are other responsibilities of the copilots. For each challenge, Topcoder dedicates a new forum where the copilot is responsible for answering the questions of participants regarding the project.

In order to successfully complete a project on Topcoder, time, budget and task management are inextricably linked and performed in a coordinated manner for each project. The Topcoder team (e.g. project manager), with the help of copilots and in consultation with job providers, break down the project into separate challenges. Once the separate challenges have been successfully completed, the Topcoder team then integrate the challenge solutions back together to produce an overall solution to the job provider's problem [P4, P7, P10, P12, P13]. For example, one of the job providers explained: "*Topcoder team said we're going to break this up. They said we will break this down into sections and we will focus on these sections for you and we will help manage these challenges and then we will make sure all of these things get done to your specifications. So, they broke that down, they said we should do a challenge for aggregation, we should do a challenge for design and we should do a challenge for the API*" [P41] and one of the copilots described "*I have to schedule and create a game in line with the budget and the deadline of the project*" [P4]. Therefore, it is essential to consider the task division, time, and budget together to achieve optimal work organization for solving complex problems with the help of the crowd.

What makes the practices specific to the crowdwork setting is the importance of managing tasks, time, and budget to be in line with the norms of flexible scheduling and gig working, as one of the projects managers emphasized: "*I design tasks in a way that developers in their free time might be able to work on it and get it done in 3 days*" [P25]. In addition, one of the copilots mentioned: "*The reality is that Topcoder members do work on challenges/tasks part-time and things do come up. It can be quite difficult to estimate the time required for a task before attempting to solve a certain problem*" [P11], and another one explained "*The role of a copilot can be hard in the sense that you have more responsibility; with a poorly designed task you can spoil the fun of many contestants and also waste the money of the client*" [P4]. Interestingly, one of the job providers emphasized: "*Topcoder is very good at process management. So, they put everything out on a timeline, and they say this is going to be achieved here, this is going to be achieved here and then if there are some issues, they'll push it back but a general idea of where we need to be and when we need to be there. They are great at managing our challenges*" [P41].

In sum, the combination of the practices of time management, budget management, and task management relies on the specific daily efforts of three parties: workers, platform owner, and job providers. The platform owner supervises and manages the expert workers (e.g., copilots) as well as do consultations with job providers. The expert workers, then, design challenges in terms of time, budget, and task division through collaboration with job providers and the platform owner.

Flexibility in Location of Work

Flexibility in location of work refers to the control that workers have over their working place. The ability to decide where to work is another key benefit of gig working that increases workers satisfaction through enhancing the sense of autonomy as well as reducing the work stress (Spreitzer et al., 2017; Gol et al., 2018). We found that a considerable number of workers on Topcoder were satisfied with doing remote works as highlighted by the following statements: "*I do my work at my home while I'm in a playroom with my children*" [P20] and another emphasized "*I like Topcoder as I can choose where I want to work from. I don't have to be in the office*" [P3]. This led us to investigate further how the flexibility in location of work is formed and managed in practice. We found that virtual communication and cultivating workplace friendships are the main practices that organize location flexibility on Topcoder.

Virtual Communication. As crowdworkers do not work from a specific place with a determined time zone (instead they flexibly work from different countries across the world), as well as do not work for one specific organization, there is little traditional organizational communication, i.e., "*sending and receiving messages that create and maintain a system of consciously coordinated activities or forces of two or more people*" (Tompkins, 1984, pp. 662-663). However, while crowdwork provides freedom from the defined workplace, freelancers still feel necessary to have a place to conduct their business communication and collaboration with their partners during a project (based on Hong and Pavlou, 2013). Unsurprisingly, virtual communication is essential in this. What makes Topcoder's case interesting is the sheer number of

dedicated virtual communication opportunities (per task, per job provider, per topic) available for different stakeholders.

First, virtual communication is facilitated between workers and Topcoder through digital forums. There is a dedicated forum per each challenge where workers can ask questions and receive answers from the copilot running the challenge: "*forums are about troubleshooting, specifications, and clarifying things what I need to build, what I need to add, technical stuff and that's it*" [P5]. Questions are usually answered promptly but sometimes there is a delay when the client is unavailable: "*I can answer questions posed by competitors during weekends in case the clients/PM are not available. As for competitors and reviewers, interacting with them is not much of a problem as they are quite active and prompt on forums. In short, distance is not a problem at Topcoder*" [P11]. In addition, there is a different channel for workers on Slack where they can talk and discuss issues with each other not limited to a specific challenge: "*The Slack channel of Topcoder is very active and that's where I mostly communicate with other member*s" [P10].

Second, virtual communication is facilitated between copilots, reviewers, and project managers regarding the challenges. It is usually done through Slack channels. They talk about the details of the project, required technologies, problems, and everything about the projects. A separate Slack channel is also created for each job provider and includes Topcoder staff, copilots, reviewers, and the job provider representative to discuss the project. As described by one of the copilots: "*we have many Slack channels. We have a community channel, we have a Topcoder internal channel. In most cases, we create a different Slack channel for each customer. E.g., we have an IBM/ Topcoder channel where we discuss all the details related to the IBM projects*" [P8]. One of the challenge architects in Topcoder further explained: "I *spend the first 30 minutes catching up on emails and Slack messages. Following that, I start working on projects I am assigned to, attending meetings with clients, communicating with copilots, and collaborating with other architects*" [P29].

The enormous scale of this virtual communication architecture makes the daily achievement of the work possible, but virtual communication is also essential in maintaining the distributed organization and for handling conflicts. For example, Topcoder project managers often must solve problems that appear among

the expert workers (e.g., copilots and reviewers) and job providers during the projects. They communicate with the job provider and aim to solve potential problems related to technology, time, project requirements, and price. For instance, one project manager mentioned: "*I work between the client and copilot. Sometimes there are technical problems where the copilots tell us, 'What clients are asking for is a bad idea and here's why or that can't be done with X. So, we communicate with the clients and try to find a good solution*" [P28] and one of the copilots mentioned: "*It happened to me a couple of times when the client doesn't respect the timeline. I had the challenge that it had to be run in 2 or 3 days, but the client disappeared suddenly. So, I called the project manager and complained about that, because the client had to pick the winner. In these situations, usually, project manager extends the timeline and calls the clients and talks to them*" [P5].

Maintaining the distributed organization is a particular challenge in crowdworking that needs ever more sophisticated means of virtual communication, as explained by a community manager: "*Personally I would say communication with the members is something that is particularly challenging, because when the community team needs our members to know a particular piece of information or an announcement, we place them all over in hopes that it reaches them (Social Media, Forums, Slack, etc.), although we still get messages like "We didn't know this was happening". To become better at this, we will be incorporating a lot of these types of announcements on my dashboard page, which will be sure to reach all of our active members*" [P24].

Moreover, virtual communication does not eliminate the challenges arising from different time zones, as explained by one of the copilots: "*Topcoder copilots have a lot on their plate: from interacting with clients, updating admins about ongoing projects, to answering queries from competitors and reviewers. Coordination among all these stakeholders is an uphill task given the physical distance and different time zones*" [P6]. Therefore, workers and Topcoder staff along with the job providers need to manage these kinds of challenges through indicating regular times to check the announcements over the virtual channels and coordinating their activities across different time zones.

In sum, the practice of virtual communication relies on the daily efforts of the workers, the platform owner, and the job providers. The platform owner provides and manages the infrastructure (e.g., Slack channels, and forums), steers the collaborations and discussions with the two other parties, and solves potential issues that arise during the project. The workers consult with job providers to specify their project requirements, both directly and through a platform representative (e.g., project manager). Finally, job providers attend to their own channel to answer the questions of expert workers and Topcoder staff regarding the project, express their opinions about the project processes and engaged in a consultation process with both parties.

Thus, virtual communication plays an important role in organizing work in creative crowdwork platforms where a lot of coordination and management is needed among people who work on complex projects. In platform mediated gig work, virtual communication is not just a practice of *interaction,* it becomes a practice of *placement,* maintaining the balance between the flexibility in the location of the workers and the specificity in the location of the work.

Cultivating Workplace Friendships. Another considerable challenge that belongs to the gig working platforms where crowdworkers do not work from a specific location with a unique time zone is social isolation (Spreitzer et al., 2017). While crowdworkers feel satisfied with having an ability to choose their workplace, the associated potential isolation from peers and colleagues is an oft-reported negative side effect that workers seek to overcome (Brabham, 2010). We find that in Topcoder this is achieved through the practice of cultivating workplace friendships, which reinforces the distributed nature of the workforce and manages the balance between task-oriented and personal interactions on the platform.

Workplace friendships include "*mutual commitment, trust, and shared values or interests among workers, in ways that go beyond mere acquaintanceship but that exclude romance*" (Berman et al., 2002, p. 1). Workplace friendship helps to decrease stress, improve communication, and assist workers and managers perform their tasks (Berman et al., 2002). The virtual interaction and placement architecture of Topcoder (e.g., Slack channels, as described above) are essential in helping to cultivate workplace friendships.

We observed that Topcoder strives to establish a friendship-focused environment to overcome the solitary feeling among workers by providing a good infrastructure via its Slack channels and forums within the platform for workers to talk and have discussions with each other anytime, anywhere beyond the technical aspects, as one of the workers emphasized: *"I feel Topcoder is an extension of my family right now, because I talk to members and Topcoder managers every day. It is like a real office for me. I spend the whole day talking about the project, challenge, and it is just for fun. The best friends that I already have are from Topcoder. They are from India, Romania, France, Italy… around the world. When I got started, I really liked this communication, because I felt I am part of something. The communication of Topcoder, especially with the new members, is really good" [P4].*

Another worker described "*I know many members in person. By the way that is a great part of the "Topcoder experience", meeting awesome people from all over the world, I have a lot of friends now and we talk about everything there such as our interests, sports, games and many other things"* [P10]. Moreover, one of the expert workers explained how supportive members of the Topcoder community are and mentioned: "*I really enjoy being part of the community. It is amazing how helpful people are on the platform*" [P8].

In sum, the practice of cultivating workplace friendships relies on the regular efforts of both the workers and the platform owner. The platform owner provides and manages the infrastructure (e.g., virtual channels, and forums) and participates in the creation of a friendly environment through attending to personal chats with workers as well (e.g., personal chats between project managers and copilots that go beyond challenge or project-related discussions) that motivate workers to join these channels. The workers reinforce the friendly community atmosphere that helps overcome the solitary nature of freelance work (Spreitzer et al., 2017).

DISCUSSION

This study explored how work is organized in creative crowdwork platforms through the combined practices of workers, platform owner, and job providers to achieve and manage three dimensions of

flexibility. Topcoder was investigated as an extreme case of creative crowdwork platforms that is (a) highly successful, (b) attracts both top technical talent and top job providers, and (c) stands out among crowdwork platforms with high rates of satisfaction among both workers and job providers. This study contributes to a better theoretical and practical understanding of how work is organized in crowdwork platforms by delineating how the combined practices of three key parties in the platform create these positive outcomes.

The identified practices include professional socialization and career development for successfully organizing flexible employment relationships; time management, budget management, and task management for successfully organizing flexible scheduling; and virtual communication as well as cultivating work friendships for successfully organizing location flexibility. We note that one interesting and significant emerging outcome of the combined practices is the social construction of *psychological safety* (see Figure 1).

- Time Management
- Budget Management
- Task Management

- Professional Socialization
- Career Development

Scheduling Flexibility

Employment Relationship Flexibility

Psychological Safety

Location Flexibility

- Virtual Communication
- Cultivating Workplace Friendships
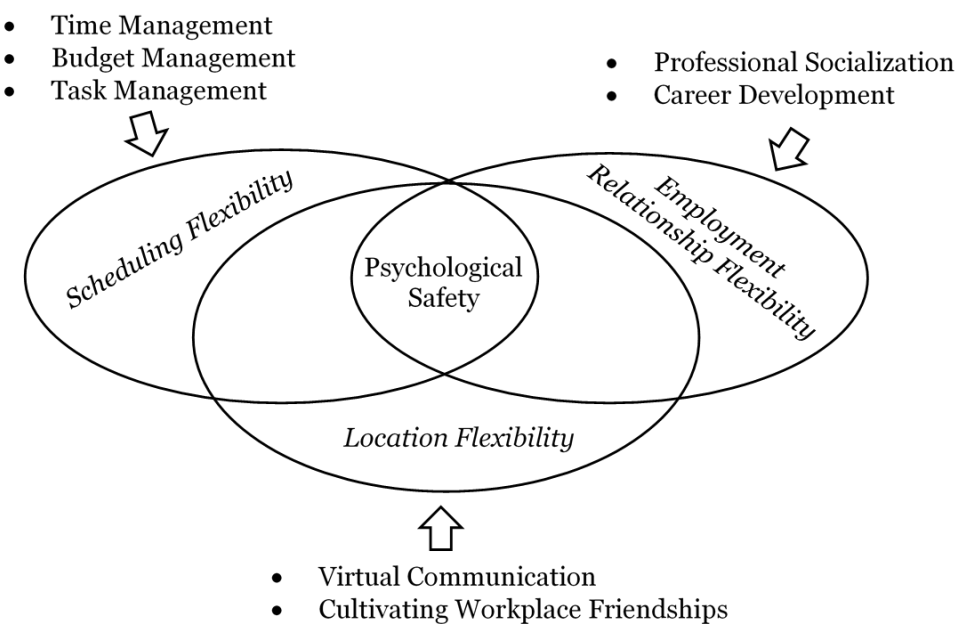
Figure 6. Work Organization for Psychological Safety Under Three Dimensions of Flexibility

Psychological safety (Edmondson, 1999) refers to the "individuals' perceptions of the consequences of taking interpersonal risks in their work environment" (Kark and Carmeli, 2009, p. 787). When workers

feel psychologically safe, despite the small chance of winning a competition on Topcoder, they have the ability to expose and employ themselves without concern of negative effect on self-image, position, or career (Kahn, 1990; Gol et al., 2018). As shown in Figure 1, psychological safety as an outcome is conceived through the combined practices of the three key stakeholders in the creative crowdwork platform.

For example, professional socialization and cultivating work friendships provide professional and personal learning opportunities for workers, supported by the extensive virtual communication practices and architecture. The involvement of the platform owner and job providers in many of these interactions bring all three parties closer together and ensures collective responsibility for not just the successful accomplishment of work projects but also the successful maintenance of the Topcoder spirit. As described by one worker: *"We have many practices regarding how to help each of our team members grow, as continuous improvement is one of our core values. I believe growth can happen when there is psychological safety for each team member to admit their weaknesses and mistakes without fear of being laughed at or judged. We achieve it through trust, transparency, and regular constructive feedback"* [P9].

In addition, time management, budget management, and task management interweave with virtual communication and career development to achieve sophisticated work organization that relies on platform owner, job provider and workers as well as is inherently designed to provide workers with growth and development opportunities. For example, the close collaboration between copilots and project managers, as well as the consultation process between copilots, project managers, and job providers ensures that the questions of workers are answered, the requirements of job providers taken into consideration and the ability of Topcoder to deliver results on the project guaranteed.

The combined practices of time, budget and task management not only improve psychological safety among workers, but also increase it in job providers as one of the companies articulated: *"this is actually the first project that we've worked with Topcoder, but I have to say it's probably one of the best projects that I have worked on as far as process is concerned. This platform allowed us to actually build a product and work in a process that was five times faster than it would have been if we had done this internally. We*

had a big innovative idea, but we had to find a way to make it happen that didn't take a decade. So, Topcoder was a great means to that end because we could engage these groups to help us build parts of this thing in a faster, more efficient way" [P40].

Thus, psychological safety not only provides intrinsic motivation to workers to keep offering their services via the crowdworking platform despite potential lack of financial reward (Gol et al., 2018), but also motivates job providers to take the risk of using the crowdwork platform. In addition, the work organization that generates psychological safety also provides all parties with a feeling of trust in the process of work, despite the known challenges with trust under conditions of employment relationship, scheduling, and location flexibility.

From a practical perspective, this study can guide practitioners in the design of a successful creative crowdwork platform. While our study revealed the practices of organizing work for psychological safety under the three dimensions of flexibility, work (re)design recommendations (e.g., task, relationship, and infrastructure design) can be derived from the identified practices. Our findings suggest three potential principles - task achievability, career significance, and relationship variety – to be explored in future research.

CONCLUSION

In this paper, we explored how work is organized in creative crowdwork platforms to achieve and manage three dimensions of flexibility through interweaving and combining practices of three parties (workers, platform owner, and job providers) by considering Topcoder as a successful case. We explored professional socialization and career development as the main practices to achieve and manage employment relationship flexibility; time management, budget management, and task management as the main practices to achieve and manage the scheduling flexibility; and virtual communication and cultivating work friendships as the main practices to achieve and manage the location flexibility. In addition, we found psychological safety for both workers and job providers as an important outcome of the interweaving of these practices.

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