

# The Rise of Crowd Aggregators - How Individual Workers Restructure Their Own Crowd -

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**Abstract.** Crowd work has emerged as a new form of digital gainful employment whose nature is still a black box. In this paper, we focus on the crowd workers – a perspective that has been largely neglected by research. We report results from crowd worker interviews on two different platforms. Our findings illustrate that crowd aggregators as new players restructure the nature of crowd work sustainably with different effects on the behavior as well as the existing relationships of crowd workers. We contribute to prior research by developing a theoretical framework based on value chain and work aggregation theories which are applicable in this new form of digital labor. For practice, our results provide initial insights that need to be taken into account as part of the ongoing discussion on fair and decent conditions in crowd work.

**Keywords:** Crowdsourcing, Crowd Work, Digital Work, Division of Work.

## 1 Introduction

In the last few decades the nature of work and employment relations has been changed sustainably on various levels, particularly caused by the restructuring of value chains [1]. As a result, the relationships are becoming unstable and the number of self-employed people is increasing in many industries [2]. With the rise of new information and communication technologies (ICT) as well as the internet, value chain restructuring relates to digitally mediated services. Nowadays, these services increasingly take place on online labor markets where labor is exchanged for money via the internet [3]. However, in course of the online labor markets a new form of digital work has emerged, i.e. *crowd work*.

This phenomenon can be described as a distinct type of labor that is located at the intersection of digital work and gainful employment, in which an undefined mass of people (i.e., crowd worker) creates digital goods via an open call [4]. Substantial parts of the value creation take place on IT-facilitated platforms provided by intermediaries. These intermediaries usually divide the tasks into discrete subtasks, distribute them and subsequently aggregate the contributions to a final solution [5].

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Crowd work has shown a strong track record as the number of platforms and crowd workers has been growing continuously. Hence, the World Bank estimates the total crowd work market to be \$4.8 billion in 2016 and up to \$25 billion in 2020 [6].

Despite this rather growing importance, research on crowd work is still in its inception, in particular regarding the ones who perform the work, i.e. the crowd workers. Prior research that focused on the individual crowd worker have examined their motivations to participate in different types of projects [e.g., 7, 8], their demographical backgrounds [9], or analyzed antecedences of their task performance [10]. Furthermore, other researchers focused on characteristics of the crowd that meet specific organizational needs [11], as well as trust-related aspects [12]. Although few studies have been conducted to address the individual worker, there is a gap in understanding experiences and perceptions of crowd workers [13], in particular regarding the structure of work. Most research focused on the intermediaries and the processes of work aggregation on online labor markets [14, 15]. However, besides the ongoing value chain restructuring and its potentials, new hierarchies can be observed in online labor markets that apparently need to be analyzed out of an individual's view in order to gain a better understanding [1].

Thus, we examine aspects of restructuring and aggregation in crowd work context out of a crowd workers' perspective. For practice, it is essential to understand the continuous reshaping in crowd work in order to anticipate effects on the workforce. Furthermore, we contribute to the research fields of crowd work as well as online labor markets by describing more precisely the relationships between the involved parties and the prevailing conditions in the crowd-based value chain.

Therefore, we intend to fill the outlined research gaps regarding the perception of crowd work by addressing the following research question:

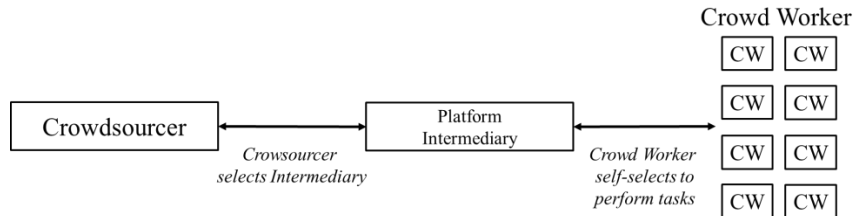
*RQ: How do individual workers perceive the nature of crowd work regarding structure and aggregation?*

## **2 Conceptual Background**

### **2.1 Crowdsourcing and Crowd Work**

The phenomenon of crowdsourcing describes a new form of outsourcing tasks, or more accurately, value creation activities and functions. According to Blohm et al. [16], the fundamental idea of crowdsourcing is that a crowdsourcer (which could be a company, an institution or a non-profit organization) proposes to an undefined group of contributors or crowd workers (individuals, formal or informal teams, other companies) the voluntary undertaking of a task presented in an open call. In this context, the ensuing interaction process unfolds over IT-based platforms. These platforms are provided by crowdsourcing intermediaries that assure the connection between the crowdsourcing companies (i.e. the crowdsourcers) and the crowd workers. Since these intermediaries provide platforms on which supply and demand of labor meet, they represent online labor markets as well as a new approach of work

organization [17]. Figure [1] illustrates the traditional crowdsourcing context including the three mentioned parties.



**Figure 1:** Roles and mediation in crowdsourcing initiatives (Source: adapted from Zogaj, Bretschneider et al. [18])

Furthermore, research has found important differences between the notions of crowdsourcing and crowd work [e.g., 4, 19]. According to Durward et al. [4] crowd work resembles a distinct type of labor that is located at the intersection of digital work and gainful employment. While crowd work is always paid, participation in crowdsourcing initiatives may have different motives and does not necessarily require financial remuneration, for example unpaid work that is done for a common good promoted by galleries, libraries, archives, or museums [e.g., 20]. Thus, out of an individual's perspective, crowd work reflects a kind of digital gainful employment that is based on crowdsourcing as organization principle. In this paper, we focus on the perception of crowd work out of an individual's view.

## 2.2 Value Chain Restructuring

In business studies literature, the value chain is an old-established concept that has been predominantly used by Porter [21] and describes a sequence of productive (i.e., value-added) activities leading to the delivery, consumption and maintenance of goods and services [22]. The term value chain is also used to emphasize the power relations, the vertical ties as well as sequential stages of production as well as service provision processes [23]. In this context, value chains are seen as dynamic and reconfigured on an ongoing basis [22]. However, online labor markets seem to be at the cutting edge of this new era of service chain value restructuring since they bring together buyers and sellers of digitally mediated service work [1].

Against this backdrop, crowd work is performed on online labor markets as crowd workers sell their skills and labor to crowdsourcers in order to generate various services that are mediated by the platform intermediary. In the last few decades, this service value chain restructuring has shaped the nature of work and employment sustainably [23]. In particular, the pattern of reintermediation has been shown to be a profound change in online labor markets since it refers to the disappearance of direct connections between clients and workers [1]. Against this backdrop, emerging structures, new forms of intermediation or aggregation in crowd work as a novel digital gainful employment need to be analyzed more precisely.

### 2.3 Work Aggregation

In general, aggregation is defined as the collecting of units or parts into a mass or whole [24]. This definition can apply to various contexts, including work and labor markets, on which work aggregators are able to break more complex projects into microtasks, distribute them to thousands of workers and subsequently aggregate the subtasks to a final solution [18]. A similar notion refers to online labor markets, in which work aggregators provide a managed service and platform usually as a layer on top of a intermediary's platform [25].

In crowd work context, there is an ideal-typical process of projects. Initially, the general task gets decomposed, described in detail and distributed to the crowd [4]. Breaking down tasks into subtasks can be provided either by the intermediary or the crowdsourcer itself. There are specific task modularization mechanism that provide functionalities that enable crowdsourcers to divide tasks into fine-grained subtasks [5]. Afterwards, the actual processing of the tasks takes place, before the solutions get selected and aggregated. Thus, this task decomposition and the reintegration are accomplished by the crowdsourcer in collaboration with the intermediary [5]. Against this backdrop, the analysis-synthesis concept comprises the decomposition of the main task into subtasks delegable to people and further the synthesis of subtasks results in order to reach the goal of the whole organization [26]. In previous research on crowd work [e.g., 5, 27, 28], work aggregation has mainly focused on the intermediaries or on the organizations as crowdsourcers.

However the perceptions and roles of the individual crowd workers regarding aggregation have been widely neglected. We assume that there are specific forms of aggregation within crowd work due to the predominant heterogeneity of potential contributors, the varying complexity of tasks and the asymmetric relationships between involved actors.

## 3 Research Method

### 3.1 Research Context and Data Collection

In order to develop our theoretical model, we analyzed the work context and perception of crowd workers on two crowdsourcing platforms – i.e., *Elance.com*<sup>1</sup> and *Freelancer.com*.<sup>2</sup> With the aim of preventing elite bias [29], we have chosen these marketplaces to overcome biases resulting from a single intermediary and due to the diversity of offered tasks as well as the various types of crowd workers. The primary data source contains of 12 semi-structured interviews since this kind of interviews are well suited in exploring attitudes, values, beliefs as well as the views of a person towards a phenomenon of interest [30]. Hence, we decided to conduct semi-structural interviews to understand the socio-technological context of crowd work out of a workers' perspective and extract their individual views regarding the nature of work.

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<sup>1</sup> <https://www.upwork.com/about/>

<sup>2</sup> <https://www.freelancer.com>

In developing the interview protocol, we therefore used Kvale’s [30] framework of conversational, qualitative interviewing as a template to ensure that our semi-structured interview elicit information relevant to our research question. Based on these guidelines, we designed an open-ended interview protocol that focused on the work environment and the perception of work by using the well-established constructs of the work design questionnaire (WDQ) [31]. In IS research it is essential to provide an explicit framework for guiding the participants throughout the interview to articulate and interpret their experiences [32]. Since the key topics of the interviews derived from the WDQ as our framework, we had to modify the wordings of the questions and adjust them to the study context of crowd work. The interviews took place between December 2015 and January 2016. Every single interview lasted between 60 and 90 minutes and was conducted with voice over IP (VoIP) communication via *Skype*. Since a respondent and an interviewer might be less engrossed in an interview conducted by telephone than in person [33] and anonymity is assured, we therefore aimed to prevent interviewer bias as well as social desirability and thus generating accurate information [34]. Subsequently, the interviews has been transcribed, coded and analyzed by using the analysis software package *ATLAS.ti*.

Since we aim to provide an unbiased data basis, numerous and knowledgeable respondents who view the focal phenomena from diverse perspectives, have been interviewed. Thus, we select respondents who differ regarding the duration of marketplace membership and performed jobs, (e.g., designing, or coding). As the evaluation of perception and behavior could differ concerning their previous experience, we interviewed more and less experienced crowd workers. Furthermore, we also analyzed their personal data that was available on their publicly visible user profiles. It has been found that the duration of membership (i.e., the time registered on the given platform), the amount of clients, the number of performed jobs and the average hourly rate of the crowd workers are reliable indicators of experience (see Table [1]). We interviewed six crowd workers per intermediary.

**Table 1.** Selection of crowd workers

<i>Crowd worker</i>	<i>Membership</i>	<i>Category</i>	<i>Jobs</i>	<i>Average Hourly Rate</i>	<i>Clients</i>
CW1	Nov 11	Writing	64	\$ 15	37
CW2	Nov 11	Writing	21	\$ 27	15
CW3	Aug 13	Translation	53	\$ 30	35
CW4	Nov 14	Programming	11	\$ 11	6
CW5	Dec 12	Administration	16	\$ 14	12
CW6	Jan 14	Programming	7	\$ 15	5
CW7	Nov 07	Translation	272	\$ 30	196
CW8	Jan 15	Writing	17	\$ 25	16
CW9	Feb 14	Translation	18	\$ 20	12
CW10	Apr 11	Writing	31	\$ 30	28
CW11	May 14	Programming	24	\$ 18	21
CW12	Aug 03	Programming	16	\$ 80	13

### 3.2 Data Analysis

We want to find out how crowd workers behave and how they organize their work on crowdsourcing platforms. Thus, according to several researchers [e.g., 35], we apply the approach of Gioia, et al. [36] to analyze our qualitative data. This methodology basically consists of two separate analysis phases. In a first iteration, the analysis follows interviewee-centric terms and concepts in an inductive fashion (1st-order analysis). Within the phase of the 1st-order analysis, a myriad of terms, codes and concepts emerged in the analysis process. Looking for similarities and relations among the many codes we reduced the number of codes to a manageable amount by relating them to concepts. We tried to focus on concepts and tentative relationships emerging from the interviews in order to develop a comprehensive compendium of 1st-order terms [36]. In this context, concepts are vaguely specified notions that capture basic qualities of a phenomenon [36]. In a second step, we organized the 1st-order concepts into 2nd-order (theory-centric) themes and distilled them into overarching theoretical dimensions. These emerging 2nd-order themes indicate concepts that might help to explain the observed phenomena. Subsequently, we distilled the 2nd-order themes even further into aggregate dimensions [36].

In sum, having the 1st-order concepts, the 2nd-order themes and the aggregate dimensions, the foundation for building a data structure is provided. Besides its visualization, the data structure represents a presentation of the process from raw data to terms and themes in conducting the analysis and thus is an essential part of demonstrating rigor in qualitative research [37]. We then formulated dynamic relationships among the 2nd-order concepts in the data structure and transformed these insights into a theoretical model [36]. The focus of building models is how to account for not only all the major emergent concepts, themes and dimensions, but also for their dynamic interrelationships [36]. Against this backdrop, we want to find out how crowd workers perceive and organize themselves in crowd work as online labor markets by following this introduced approach.

## 4 Results

In a first step, we therefore provide the essential groundwork for theory-building by developing the data structure. Our data structure includes 1st-order concepts that are significant to the crowd workers and 2nd-order themes that are extracted overarching themes. Finally, both iterations enabled us to assemble the aggregated dimensions.

### 4.1 Constitutive Elements of a Theoretical Model

**Relocation of Value Creation.** Our findings provide information about several aspects of activities abroad the intermediary's platform. First, certain crowd workers increasingly acquire more tasks on the platform than they can perform by their own. This is an intended action since they subsequently forward parts of the initial job to other crowd workers or even to an own platform external workforce. These persons are usually acquaintances, friends or even family members. We found evidence that

certain tasks are given to siblings, partners or the own children by crowd workers: *“I’m looking for someone in order to handle the workload. I’m looking for an editor as good as I am. And my son just had started. At least I can rely on him.”* (CW7).

Furthermore, these persons are to be entrusted with certain tasks regularly and thus represent a standing pool of external human resources. Identified motives for this relocation of value creation parts are trust-related aspects, reliability and more efficient interaction between the crowd workers and well-known external persons. Thus the composition of the crowd changes since external contributors get either hired by crowd workers or acquired as part of the existing crowd without necessarily register on the crowdsourcing-platform.

Second, we observed that existing boundaries between the platform-based crowd work and external activities become blurred. We observed that some crowd workers use the crowdsourcing platform only as an acquisition tool for attracting new crowdsourcers. Once the crowd workers have made the initial contact and completed first tasks, the follow-up business will be subsequently realized off-platform via different channels. In this context an interviewee stated: *“I would say that most of the business takes place offside the platform [...] Most people finally use the platform in order to acquire clients.”* (CW3).

In fact, the crowd workers proactive use various communication technologies like VoIP, E-mail, phone or virtual workplaces to interact bilaterally with the crowdsourcers instead of using the provided infrastructure of the platform intermediary. A major part of tasks and jobs are consciously processed beyond the platform sphere. In addition, all so-called after sales activities (e.g., customer service) for the crowdsourcers are independently managed by the crowd workers aside the platform. The aim is to develop long-term relationships to the crowdsourcers and simultaneously to save platform fees for both parties. Thus, the original idea of giving problems or tasks into the crowd and all steps of this service value creation will take place on platforms, must be critically questioned. We observed a contrary trend, in which particularly further business relationships develop beyond the platforms. Communication and information exchange as well as the actual task performance with the crowdsourcers take place in external settings of the crowd workers.

In sum, we identified two forms of value chain restructuring in crowd work. On the one hand, we observe an additional step in the crowd-based value creation since single crowd workers acquire tasks and further redistribute these tasks to external persons. On the other hand, the crowd workers are cutting out intermediation by interacting more directly with crowdsourcers and ignore the provided platform infrastructures as well as terms and conditions. This increase of disintermediation is originated from the crowd workers itself and reconfigures the existing service value chains. Hence, the value chain restructuring in crowd work is primarily based on the external relocation of certain value creation steps beyond the platform.

**Emergence of New Hierarchy.** In general, the decision-making process in crowd work is mutual. The crowdsourcers and the crowd workers are in certain negotiating situations, in which they exert bargaining power on each other through the platform. We observe this to be different when certain crowd workers undertake fundamental functions of the platform such as the management of tasks. Our analyses show that single crowd workers acquire larger tasks from the platform, decompose them into smaller subtasks and distribute these to other crowd workers. In this context, the single crowd worker takes over the governance and management of the subtasks. Furthermore, this mediating crowd worker predefines the conditions of the subtasks like payment, milestones and deadlines, based on the earlier agreements with the crowdsourcer. The other crowd workers, who perform the subtasks, do not have that much space to negotiate in this context since the general conditions have been set already. Thus, decisions are no longer being made bilaterally but by the mediating crowd worker. *"Then I realized that he himself was just a first intermediate step from another client."* (CW08), a hired crowd worker reported. In particular, unexperienced crowd workers who have not yet performed a lot of tasks, are implicitly dependent on these forwarded subtasks. They rely on information and specific input of the mediating crowd worker.

Furthermore, the conventional relationships between crowd workers and crowdsourcers depend on the scope and the type of tasks and thus vary considerably in crowd work. Nevertheless, we observe the relationships between the mentioned mediating crowd workers and the hired crowd workers, to be more long term oriented. The crowd workers who distribute the subtasks aim to develop long-term business relations to the task-performing crowd workers irrespective of the scope or type of task. One reason for this is a certain level of quality assurance since this closer business relationship permits a better control out of the mediating perspective. In the view of the performing crowd workers, this relation might be advantageous as well since they get tasks on a regular basis and thus a more secure income. *"They want to hire you more often and can save the fees for Elance."* (CW7), an interviewee said.

The division of labor is an essential characteristic of crowd work that varies regarding the different nature of tasks. Nevertheless, our analyses indicate that the mediating crowd worker acquires large projects and tasks on the platform, then decompose them and subsequently again broadcast the subtasks to the crowd. For example, the translation of a book chapter in English to French and German does not usually involve any division of labor. The crowd worker acting as an intermediary, however, acquires as well as decomposes the actual task of translation into several subtasks and then distributes them to other crowd workers he will hire. One crowd worker actually translates the text to French, while a second crowd worker will do the same in German. A third crowd worker subsequently proofread the translations before the mediating crowd worker will aggregate the subtasks into a final solution, submit it on the platform and thereby present it to the crowdsourcer. Since this trend is observable in various types of tasks, we can state that the division of labor tends to increase when those mediating crowd workers are present.

Therefore, with the rise of the introduced mediating actor, an additional element of the service value chain has emerged. Since dependencies between crowd workers



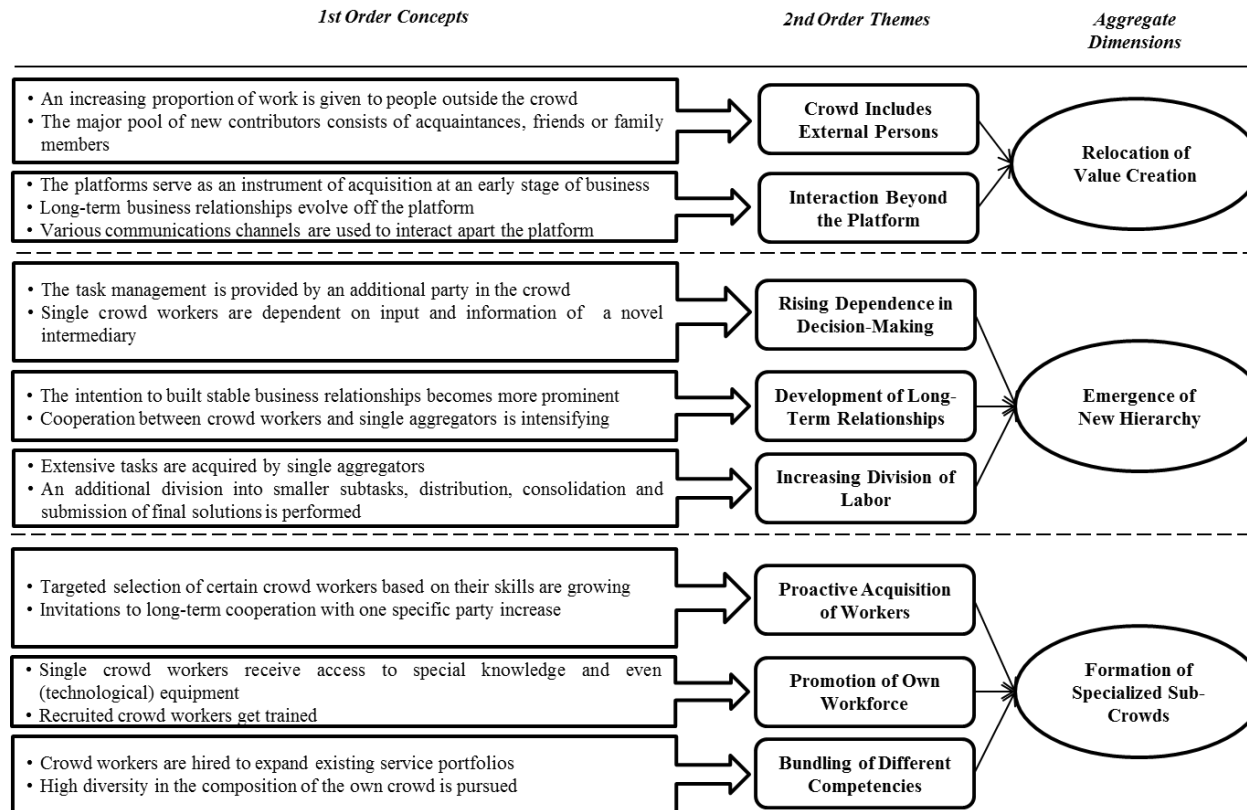
shift and coordination as well as interaction becomes unilateral, we observed recent developments in crowd work towards more hierarchical structures.

**Formation of Specialized Sub-Crowds.** The single crowd workers who manage own tasks and projects apart the platform intermediary act as new intermediaries in crowd work contexts themselves. Thus they need their own standing workforce to expand and gain even more jobs. In order to achieve a competitive advantage, these mediating crowd workers, thus acquire their own specialized crowd. They proactively contacting other crowd workers based on their experience and skills to work for them. One interviewee stated: *“There are always many tasks you need certain specialists for and those are forwarded [...] so when you are chef, you say that the cutting of onions is taken over by the assistant.”* (CW12). The aim is to develop an own pool of expertise that is committed in the long-term by regularly forwarded tasks. Thus, these selections of workers represent sub-crowds that partially use the infrastructure of the platform but are managed by single mediating crowd workers.

Furthermore, these sub-crowds extend the own portfolio of the mediating crowd worker since new services, based on the crowd workers` skills, can be offered on the platform. Against this backdrop, the single mediating crowd worker wants his sub-crowd to be highly diverse concerning their capabilities. For example, a single crowd worker who offers the development of application programming interfaces (API) on the platform by itself begins to build up his own sub-crowd in the area of software development. Thus, the single crowd worker hires a specialist for agile software development methods and another backend developer who is proficient in different programming languages. Finally, a third crowd worker who is an engineer for the design of software products will be hired. The new intermediary manages all activities, subsequently consolidates and aggregates the single subtasks to a final solution. From a marketing point of view, the mediating crowd worker extended its own portfolio by forms of horizontal and vertical diversification.

Once the mediating crowd workers have built up their own workforce, some of them actually invest in their sub-crowds. They provide equipment (e.g., professional software to translate texts) and even share their own expertise and knowledge (e.g., by providing good own design templates). In line with this, one worker mentioned: *“So I bought him the transcription software F4 [...] and he would not been able to afford the 50 Euros himself.”* (CW7). Thus, the mediating workers act as some kind of mentor and develop their sub-crowds.

In sum, we outline our data structure in figure [2] which illustrates the 2nd-order themes on which we built our model of crowd work aggregators. These insights enabled us to develop a theoretical model of structures and concepts that emerged from the data. Hence, figure [2] represents first building blocks of a theory that have to be aligned and set in relation to each other in the next section.



**Figure 2:** Data structure

## 4.2 The Role of Crowd Aggregators as New Elements of Value Creation

Although the data structure is essential, it is nonetheless the static picture of a dynamic phenomenon of interrelations [36]. Thus, we develop an inductive model that is grounded in the data of the crowd workers and captures the nature of crowd work in theoretical terms. Therefore, our model shows the dynamic relations amongst the emergent 2nd-order concepts which describe restructuring and reintermediation processes caused by new players in crowd work – i.e., the *crowd aggregators*.

The identified inclusion of external persons in existing service value creation processes changes the nature of crowd work sustainably. In particular, well-known persons of actual crowd workers are actively involved: “*Well, I have also invited friends and kind of activated them as a freelancer. They were previously no freelancers. And I knew what they are capable of and that they will work for that salary.*”(CW4). In addition, the interactions between crowdsourcers and crowd workers increasingly take place not only via the platforms but using various channels aside. Hence, we propose that single crowd workers are responsible for this shift away from the actual platform-based crowd work towards a hybrid non-platform-based shape with external elements.

**Proposition 1:** Crowd Aggregators consciously relocate parts of the value creation in crowd work.

Furthermore, certain crowd workers build up their own workforce by delegating prior decomposed subtasks to other crowd workers. In particular, unexperienced crowd workers are dependent on these tasks in order to gain reputation on the platform. Since the mediating worker usually unwinds repetitive tasks with the same crowd workers, this situation resembles an employer-employee-like relationship. Thus, a long-term relationship between the mediating crowd worker and the task-performing workers easily evolve. A mediating worker noted: “*In the end, I manage so to speak [...] I develop myself towards project management and have my own sub-agency.*” (CW7). Since the mediating crowd workers delegate and govern the work processes, we assume power asymmetries and dependencies to arise in these relationships. Hence,

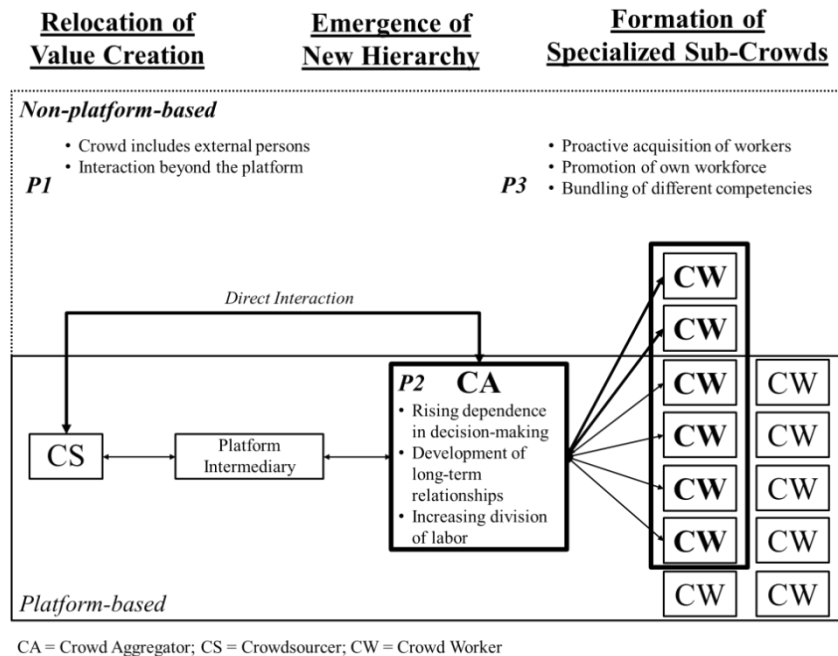
**Proposition 2:** Crowd Aggregators establish hierarchical structures in crowd work.

In addition, the aggregating crowd workers assemble a pool of other workers based on their capabilities and experience. These hired crowd workers further extend the own portfolio of the aggregator and thus represents a flexible workforce: “*I cannot program software. This is beyond my expertise. So, I hired another freelancer who is familiar with the technical details.*” (CW3). Although the performing crowd workers are supervised, we found evidence indicating that the mediating crowd worker support its sub-crowd. On the one hand, the sub-crowd benefits from knowledge transfer with the aggregator and further its expertise. On the other hand, the mediating worker provides technical equipment if necessary and thus invest in the own specialized sub-crowd in order to gain reputation and generate more business itself on the crowdsourcing platform.

**Proposition 3:** Crowd Aggregators proactively develop own specialized sub-crowds.

This crowd aggregator represents a novel business idea in which the crowd is the core instrument of the service value chain. The aggregator is able to shape its own sub-crowd and act as a digital niche provider that guarantees efficient performance based on the specific composition of the sub-crowd. It exploits the provided infrastructure of the platform intermediary and reintermediates more specific services to the crowdsourcers. While the majority of the platform intermediaries focus solely on the pure mediation of tasks, the crowd aggregator supports the crowdsourcer during the entire procedure, particularly in larger and more complex projects. Out of the crowdsourcers view, the core competences of the crowd aggregator are coordination, decomposition and refinement of tasks as well as the final quality control of the single subtasks. Thus, the main assets of the crowd aggregator contain an efficient task assignment and successful management. In sum, we therefor denote a crowd aggregator as: (1) An individual or a group of individuals that (2) act(s) as a novel intermediary and (3) use(s) existing platform infrastructure to build up its own specified sub-crowd.

Figure [3] represents the core of our research results and outlines the data-to-theory connections. It illustrates the propositions (i.e., P 1-3) and their relations since it shows the two spheres (i.e., non- and platform-based), the composition as well as the involved parties of service value creation in crowd work. In addition, the model highlights the role and interrelations of crowd aggregators within crowd work context.



**Figure 3:** Model of crowd aggregators in crowd work

## 5 Discussion

We analyzed the nature of crowd work out of an individual's perspective. Thus, we address significant methodological shortcomings since we did not exclusively rely on online data about workers and their behavior [1]. In addition, our research contributes to literature on reintermediation that already takes place in online labor markets [e.g., 23], since we found evidence that the crowd aggregator represents more than an additional step in existing structures by illustrating their impact on structural as well as organizational level [1]. Previous research examined that crowd work describes a new system for the coordination of work that can be classified as ranking between the established forms of the two organizational principles of market and hierarchy [4]. Our findings indicate that crowd work redevelops towards hierarchical structures due to the rise of crowd aggregators. The unilateral decision-making processes, the long-term relationships between aggregator and its workers as well as the higher level of division of labor rather describe crowd work as more hierarchical. Furthermore, our findings can be explained by a lack of automated coordination mechanisms [38] in this crowd work context, since the crowd workers orchestrate the tasks themselves. Due to the missing of a higher-order coordination that provides the matching between the crowd and the offered tasks [26], crowd aggregators emerge as new coordinating elements. Our results are in line with the analysis-synthesis concept [26] since we illustrate that there is a need of certain decomposition and aggregation in crowd work.

For practice, platform intermediaries should closely monitor this development since the relocation of value creation aside the platform by the crowd aggregators may cause losses in control and income. In addition, our findings provide essential insights for the ongoing discussion about fair work conditions in the crowd. On the one hand, crowd aggregators exercise certain power over the crowd workers who are dependent on the aggregator. On the other hand, work conditions might be less precarious due to the rather long-term relationships, the constant supply of tasks and the enhanced provision of information. Nevertheless, the study has several limitations which constrain the generalizability of our results, since we developed our model gathering data from only two intermediaries. Further studies may overcome these limitations by evaluating the provided dimensions in subsequent empirical studies.

## 6 Conclusion

Given the lack of research on the individual in crowd work, our primary objective was to achieve a better understanding of the nature of work in the crowd. We followed a well-established methodology to conduct a qualitatively rigorous inductive study and developed a theoretical model of crowd aggregators. Our results illustrate that these crowd aggregators represent new players that restructure the workflows in crowd work on different levels and have impact on the behavior and relationships of the crowd workers. The crowd aggregators relocate activities off the platforms, reintermediate existing processes and build up an own sub-crowd. As a result, with their rise, crowd work evolves into a more hierarchical form of labor.

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