Rating-based compensation systems:
A commitment tool to promote employment relationships between crowdworking platforms and crowdworkers

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List of abbreviations

AC	Affective commitment
Adj.	Adjusted
C	Continuous variable
CA	Categorical variable
CC	Calculative commitment
CW	Crowdworking
D	Dummy or binary variable
Freq.	Frequency
fs/QCA	Fuzzy-set qualitative comparative analysis
HRM	Human Resource Management
IO	Industrial and organizational
IPO	Input-Process-Output model
IPWRA	Inverse-probability-weighted regression adjustments
Obs.	Observations
OLS	Ordinary least squares
Per.	Percentage
PRI	Proportional reduction of inconsistency
RBCS	Rating-based compensation system
Rl	Rating level
S. d.	Standard deviation
Std. dev.	Standard deviation
TEXTPLAT	Text creation platform
Z	Z-Score

1 Introduction

On December 1, 2020, the German federal labor court surprisingly announced in a single case decision that the execution of outsourced tasks by a user ("crowdworker") of the intermediary internet platform Roamler ("crowdworking platform") constitutes the qualification of a legal employment relationship (Bundesarbeitsgericht, 2020). Less surprising, the platform has already declared an ordinary termination of the employment relationship to the crowdworker in order to avoid further employer obligations. According to Section 611a of the German Civil Code, a statutory employment relationship existed because the platform provider managed the cooperation in such a way that the plaintiff crowdworker was not free to organize his work in terms of place, execution, time and content (Bundesarbeitsgericht, 2020). This was achieved by the organizational structure of the platform, which is designed to encourage crowdworkers to accept and work on small, locally restricted tasks on a continuous basis. In addition, the platform allows high-performing crowdworkers to move up within an internal platform rating hierarchy. This allows higher-rated crowdworkers to take on more tasks at once and gradually increase their notional hourly wage, as crowdworkers are typically paid per task. As if crowdworking (CW) as an employment relationship were not interesting enough, since CW is often touted as a highly flexible form of work, the court highlights a specific compensation system that promotes this strict control in a particular way, namely a rating-based compensation system (RBCS). This is significant because, to the author's knowledge, RBCS are not the subject of current CW research, but have already found their way into German labor courts. In the absence of research, a name for this compensation system on CW platforms was chosen by the author in this dissertation to address it explicitly. Overall, this recent decision of the Federal Labor Court on CW as an employment relationship and RBCSs as an incentive and commitment tool nicely but unintentionally frames the main topics of this dissertation. However, before discussing the topics of this dissertation and its scientific and practical contributions, an introduction to the terminology of CW and RBCS is necessary.

Since CW is not the only employment opportunity mediated by internet platforms, a debate has arisen on how to define the superordinate term crowdsourcing (Estellés-Arolas & González-Ladrón-de-Guevara, 2012) and thus CW as the financially compensated variant (Schulte, Schlicher, & Maier, 2020). According to Estellés-Arolas and González-Ladrón-de-Guevara (2012), crowdsourcing describes in particular a trilateral exchange between task providing clients, intermediary internet platforms, namely crowdsourcing platforms, and suitable skilled

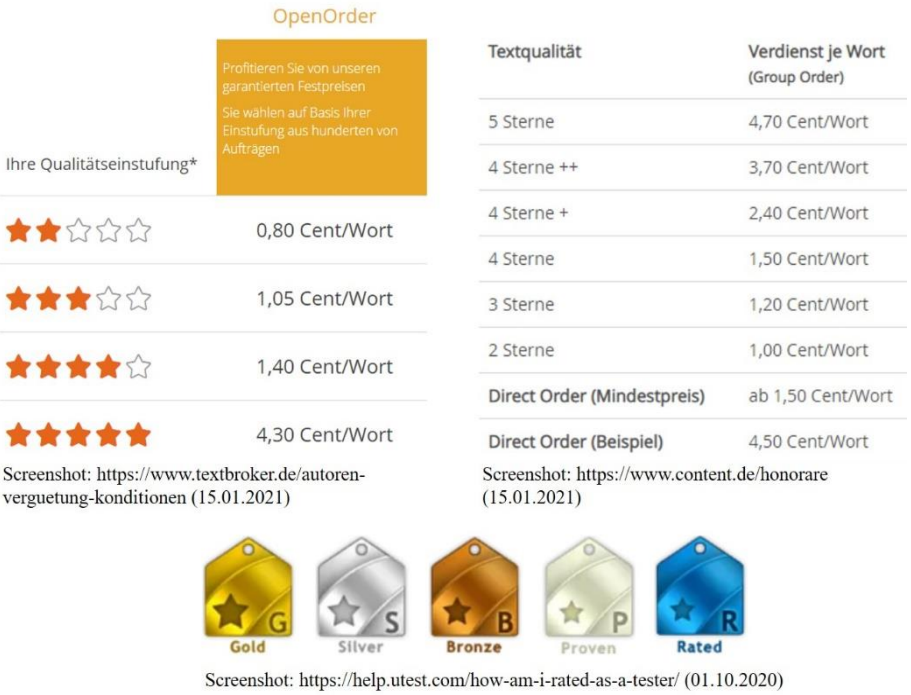
people, the so-called crowdworkers. Clients, which can be individuals, groups or organizations, can propose their tasks with clearly defined goals on a crowdsourcing platform (Estellés-Arolas & González-Ladrón-de-Guevara, 2012). The platform offers these tasks online through a call to a specific crowd, usually the platforms' registered users (Estellés-Arolas & González-Ladrón-de-Guevara, 2012). This call contains the descriptions of the tasks and information about the benefits for each actor involved. Crowdworkers take on these tasks on a case-by-case basis, without being formally employed and without being committed to a specific platform. By bringing in their resources such as time, money, effort or expertise, they receive a whole range of social and economic benefits in return, such as intrinsic enjoyment of the activity or pay (Estellés-Arolas & González-Ladrón-de-Guevara, 2012). CW as a variant of crowdsourcing specifies it in essentially one aspect, namely that on a CW platform every satisfactorily performed task of a crowdworker is financially rewarded, which is not always the case on crowdsourcing platforms (Schulte et al., 2020). The use of such platforms is without a direct charge for crowdworkers, but they are priced indirectly. The platform charges its clients and withdraws a share of the task prize for providing a working environment, mediating between clients and crowdworkers, and acting as a trustee (Durward, Blohm, & Leimeister, 2016). As such, CW more closely resembles an online labor market than a conventional organization and appears to be the results of an emerging desire for a highly flexible world of work (Schulte et al., 2020).

As the court decision made clear, the fact that involved actors make extensive use of this flexibility and avoid employment relationships is only one side of CW. The other side is the emergence of ongoing employment relationships between platforms and crowdworkers over years (Hemsen, 2021b; Schneider & Hemsen, 2021), even if not characterized or initially intended as such by all parties involved. These employment relationships are the result of regular interactions with each other, and while frequent interactions between clients and crowdworkers may occur, they usually tend to be one-off exchanges and in some cases are even conducted anonymously (Brabham, 2008; Zheng, Li, & Hou, 2011). Accordingly, crowdworkers may also enter an employment relationship with the platform if the interactions occur frequently and are broadly defined as "the connection between employees and employers through which people sell their labor" (Budd & Bhave, 2019: 41). Regardless of this designation, CW platforms face problems related to regular employment relationships (Boons, Stam, & Barkema, 2015; Schulten & Schaefer, 2015). These common problems include aspects of working conditions, training, participation, and compensation, as well as the struggle to

attract, retain, and motivate workers (Wright & Boswell, 2002).

One way for such platforms to address their incentive and commitment issues is through their compensation system in particular, as they are unwilling to contractually bind and obligate their crowdworkers to perform, thus avoiding employer obligations. Task prizes for satisfactory completion of a task, communicated upfront, are the dominant form of compensation on such platforms (Hemsen, 2021a; Schulte et al., 2020). The means platforms deal with these predefined prizes basically splits into two ways. There are platforms that take the reputation and qualifications of crowdworkers into account when compensating them, which allows crowdworkers to improve their working conditions over time, and there are platforms that pay out short-term fixed prizes independent from these factors (Hemsen, 2021a). Which way platforms choose is likely to depend on the competition among crowdworker platforms in their market segment and their need for general human capital (Hemsen, 2021b). Platforms specializing in sophisticated task types such as text creation or designing crucially rely in their success and survival on suitable skilled crowdworkers (Boons et al., 2015; Schulten & Schaefer, 2015; Zogaj, Bretschneider, & Leimeister, 2014), who are difficult to replace or recruit in a highly competitive market with few available and suitable skilled crowdworkers. Therefore, such platforms are well advised to establish a more long-term and attractive compensation system to retain and motivate their already registered skilled crowdworkers. In contrast, platforms that offer very easy entry and only require crowdworkers with basic technological skills, such as microtask platforms (Gadiraju, Fetahu, Kawase, Siehndel, & Dietze, 2017), can draw on the existing mass of suitable crowdworkers and thus pay a comparatively low task price regardless of reputation and qualifications (Sun, Wang, & Peng, 2011).

A RBCS is such a long-term compensation system and, according to Hemsen (2021a), the second paper in this dissertation, is most commonly found on platforms for sophisticated task types. Despite the active use of such systems on CW platforms for years, it is not, to the author’s knowledge, the subject of current CW research. Paper 2 defines it as a system based on a set of performance and behavior thresholds for each rating level that visualize the reputation and qualification of crowdworkers through stars, points, badges, or hierarchically ordered titles, and assign certain immaterial and material rewards (see Figure 1). This distinguishes RBCSs from "status hierarchies", where recognition tends to develop spontaneously based on visible contributions and positive feedback in online communities (Goes, Guo, & Lin, 2016). Moreover, the ratings do not only consist of the number of positive feedbacks or continuous tracking of performance, but also establish an internal platform hierarchy defined by certain



Note: The top two examples of a RBCS from the German platforms Textbroker (left) and Content.de (right) show a frequently represented type of status visualization, namely the star rating. The core element of these two RBCSs is that the payment per word increases with each additional star. In contrast, the uTest by Applause platform (bottom) uses badges to symbolize the status of its crowdworkers. Depending on the badge and the type of software or user interface testing performed, the crowdworker receives a percentage bonus on their compensation.

Figure 1. Examples of rating-based compensation systems on German-speaking crowdworking platforms

performance and behavior thresholds (Hemsen, 2021a). Both types of thresholds can include quantitative and qualitative measures where the evaluation is usually done by the platform and involved clients. Moving up to a higher rating, e.g., from a four-star crowdworker to a five-star crowdworker, therefore implies a leap similar to a promotion within an internal labor market in an organization (Auriol & Renault, 2001; Hemsen, 2021a). Similar to an internal labor market, a RBCS bestow immaterial and material rewards to crowdworkers (Hemsen, 2021a). Immaterial rewards in the sense of recognition, self-affirmation, glory or reputation, because the rating levels usually are publicly available at least for every registered client and crowdworker (Auriol & Renault, 2001; Goes et al., 2016). Crowdworkers may also receive material rewards, such as higher task prizes, bonuses or privileges such as access to more tasks or accepting multiple tasks simultaneously (Hemsen, 2021a). Platforms with a RBCS, on the other hand, benefit from the aspects of information and control. As RBCSs seem to be a suitable

tool to reduce information asymmetry regarding the qualities of crowdworkers, platforms are enabled to form groups of crowdworkers with different qualification levels based on the collected information and to control their crowd according to their own and their clients' requirements (Hemsen, 2021a). Overall, RBCSs seem to be a promising tool of platforms to enable their skilled crowd to improve their working conditions and pay through requirements-based performance and behavior, making RBCSs on platforms a significant driver of crowdworkers' motivation and commitment to the platform. What additionally supports the Federal Labor Court's decision that the RBCS on the CW platform Roamler plays a significant role in establishing an ongoing employment relationship between the platform and a crowdworker.

Years before this court decision, the original intention of this dissertation was to already address RBCSs as a practically relevant but surprisingly under-researched type of compensation system on CW platforms that seems to foster mutual commitment between the respective platform and its registered crowd and motivate its crowdworkers in the long run. This should shed light on the apparent paradox of CW being a highly flexible working arrangement between three parties on the one hand, and regularly interacting parties willing to commit to each other on the other. This, in turn, contradicts Howe's (2006) original idea about crowdsourcing and thus about CW. But, like other long-term relationships, some end up in court in dispute because one party was unwilling to accept the obligations of such a relationship. Nevertheless, the case decision of the Federal Labor Court not only underpins the practical relevance of the core topics of this dissertation, but as a precedent is also likely to have implications for the assessment of other statutory employment relationships and the design of compensation systems in the German CW market. Moreover, there is a risk of hasty decisions that may harm the wrong platforms with a RBCS, which pay comparatively high prizes and have a more reciprocal relationship with their crowdworkers, rather than regulating CW platforms with more precarious working conditions. If so, this dissertation, with its scientific and empirical foundations, especially on CW as an employment relationship and RBCSs, should be useful not only for academic audience but also for political and legal decision makers.

The four papers included in this dissertation contribute to the understanding in the following ways. Paper 1 by Hemsen, Schulte, Schlicher, and Schneider (2021) comprises the first systematic content analysis of empirical work on CW-as-employment relationship and uncovers important under-researched topics from human resource management (HRM) and industrial and organizational psychology perspectives, as these disciplines inherently involve

different perspectives. Based on these findings and examined contexts, five important but under-researched areas stand out, namely long-term strategic workforce planning, legal issues, leadership styles, careers on platforms, and employment relations. The topic employment relations encompass the employment relationship as such and collective representation through works councils or unions. To address some of the under-researched areas, particularly career development and employment relations, this dissertation highlights RBCSs as a tool for platforms to commit and motivate crowdworkers in the long run.

Due to the lack of research on RBCSs, Paper 2 by Hemsen (2021a) acts as a link between Paper 1 and the following Papers 3 and 4. Paper 2 provides first insights into RBCSs by providing an overview of 32 examined German-speaking platforms with and without such a compensation system. Based on this overview, it introduces the system to the CW literature by explaining its basic composition, highlighting characteristics of platforms with and without a RBCS, and reconstructing the logic using internal labor markets and forms of deferred compensation. Both concepts were developed for regular employment (Doeringer & Piore, 1985; Dunlop, 1966; Lazear, 1990) and their function can be additionally explained by the goal-setting theory from Locke and Latham (2002).

Building on Paper 2, Paper 3 by Schneider and Hemsen (2021) identifies mechanisms that generate commitment to a text creation platform with a RBCS and shows that the multidimensional concept of organizational commitment of Meyer and Allen (1991) is applicable to CW platforms. In this case study, the facets of affective and calculative (originally termed “continuance”) commitment have been shown to be particularly relevant for CW. Whereby affective commitment of crowdworkers towards the platform can be defined as "emotional attachment to, identification with, and involvement in" the platform (Meyer & Allen, 1991: 67). Calculative commitment, on the other hand, can be defined in the CW context by the degree to which crowdworkers need to stay with the current platform because they have no alternatives or it is too expensive for them to switch (Meyer & Allen, 1991). Building on this, Paper 3 differentiates groups of crowdworkers by their level of affective commitment, calculative commitment, and personal circumstances, and examines how their participation and intention to stay on the platform differ.

Finally, Paper 4 by Hemsen (2021b) takes a different but complementary path to Paper 3. It examines crowdworkers from platforms with a RBCS and platforms with a non-reputational fixed task prize system, as well as differently rated crowdworkers within a platform, to test the effectiveness of a RBCS in motivating and committing crowdworkers. Overall, this dissertation

identifies and addresses important research gaps for CW that are of scientific and practical relevance, and contributes to the transfer of extant work on employment relationships and incentive design from HRM and psychology to the CW context.

2 Research questions and contextual order

The focus of this section is to highlight the research questions of each previously outlined paper and to illustrate the contextual order of the four papers included in this dissertation. However, since the underlying motivations and theoretical reasoning of each paper differ, detailed information on these can be found in the respective papers. What the theoretical reasoning of the respective papers has in common is that it draws on extant work on employment relationships and incentive design from a personnel economics (e.g. internal labor markets, deferred compensation and goal-setting theory) and psychology perspective (e.g. organizational commitment and motivational aspects) and applied it to the CW context. In doing so, the papers and thus also this dissertation show that, despite the novel appearance of CW, it is mostly a rearrangement of familiar processes and information flows to achieve goals comparable to regular employment relationships (Puranam, Alexy, & Reitzig, 2014). This transfer additionally brings a deeper theoretical reasoning to CW research that can be described as more exploratory (Hemsen et al., 2021; Zhao & Zhu, 2014). An overview of the research questions examined in each paper and the order of the four papers in this dissertation is provided in Table 1, while Figure 2 additionally clarifies the actual connections and contributions.

Table 1. Content order of the papers included in this dissertation and their research questions

	Paper 1
Authors	Hemsen, Paul; Schulte, Julian; Schlicher, Katharina D. & Schneider, Martin R. (2021)
Title	Crowdsourcing for paid work as a new form of employment relationship: A content analysis.
Research questions	1. *What do we know about crowdworkers' employment relationship from empirical research concerning e.g. pay, working conditions, work design, motivation, satisfaction and commitment – in short, the topical areas that make up the employment relationship?* 2. *Building on this, which problems in this relationship are similar to, and which are different from regular employment?* 3. *Are any topics under-researched?*

Table 1. Continued

	Paper 2
Author	Hemsen, Paul (2021)
Title	How do rating-based compensation systems on crowdworking platform work? Providing long-term and reputational compensation for expert crowdworkers
Research questions	*1. How are RBCSs composed in terms of used performance and behavior evaluation criteria or thresholds, visualizations of status and designated incentives?* *2. What are characteristics of CW platforms with a RBCS?* 3. *How may a RBCS matters for crowdworker's performance on the platform and their commitment to the platform?*
	Paper 3
Authors	Schneider, Martin R. & Hemsen, Paul (2021)
Title	Freelancers who stay? A fuzzy-set qualitative comparative analysis of affective and calculative commitment among crowdworkers to a platform
Research questions	*1. What mechanisms generate commitment to a CW platform with a RBCS?* *2. Can we identify groups of highly committed crowdworkers who differ from each other in terms of the reasons why they are committed?* 3. *How is each of two components of high commitment – affective and calculative – related to crowdworker participation and intention to stay on a platform?*
	Paper 4
Author	Hemsen, Paul (2021)
Title	Rating-based compensation systems as a commitment tool on crowdworking platforms. An empirical analysis of four platforms
Research questions	*1. How do RBCSs on CW platforms motivate crowdworkers and commit them to the platform?* *2. Do crowdworkers show higher affective and calculative commitment to platforms with a RBCS and do they perform better there?* *3. Does the affective and calculative commitment of crowdworkers to a platform and their performance increase with their rating level?*

As Table 1 shows, the successive construction of the research questions across the papers suggests that the papers are closely related. Thus, an unfolding path can be seen between Papers 1 through 3. It is a path that begins with the identification of CW as an employment relationship and other under-researched topics, then continues with the conceptualization of the under-

researched RBCS to foster such ongoing relationships, and currently ends with a case study of mechanisms that explain commitment and the behavior of such groups of differently committed crowdworkers from a text creation platform with a RBCS. Although four of the five under-researched topics, namely long-term strategic workforce planning, career development, leadership, and employment relations, are at least touched upon, Papers 2 and 3 are particularly devoted to career development on a platform with a RBCS and resulting employment relations. However, legal issues as another important, under-researched topic are not addressed in this dissertation, as it is primarily written from a personnel economics perspective with references from human resource management and industrial and organizational psychology. Finally, Paper 4 also builds on the conceptualization of a RBCS in Paper 2. Thus, it takes a separate but complementary path to Paper 3. Unlike the case study in Paper 3, it examines the effect of a RBCS on performance and commitment among both crowdworkers from four CW platforms with different specializations and crowdworkers with different rating levels. Paper 4 therefore highlights the effectiveness of RBCSs and compares them to non-reputational fixed task prizes, while Paper 3 emphasizes the transfer of the multidimensional concept of organizational commitment to the CW context and explores the underlying mechanisms in the context of the platform's compensation system. Similar to the other contributions in this dissertation, Paper 4 is also mainly concerned with career development and employment relations on platforms. All these connections and the papers' contributions are also shown graphically in Figure 2.

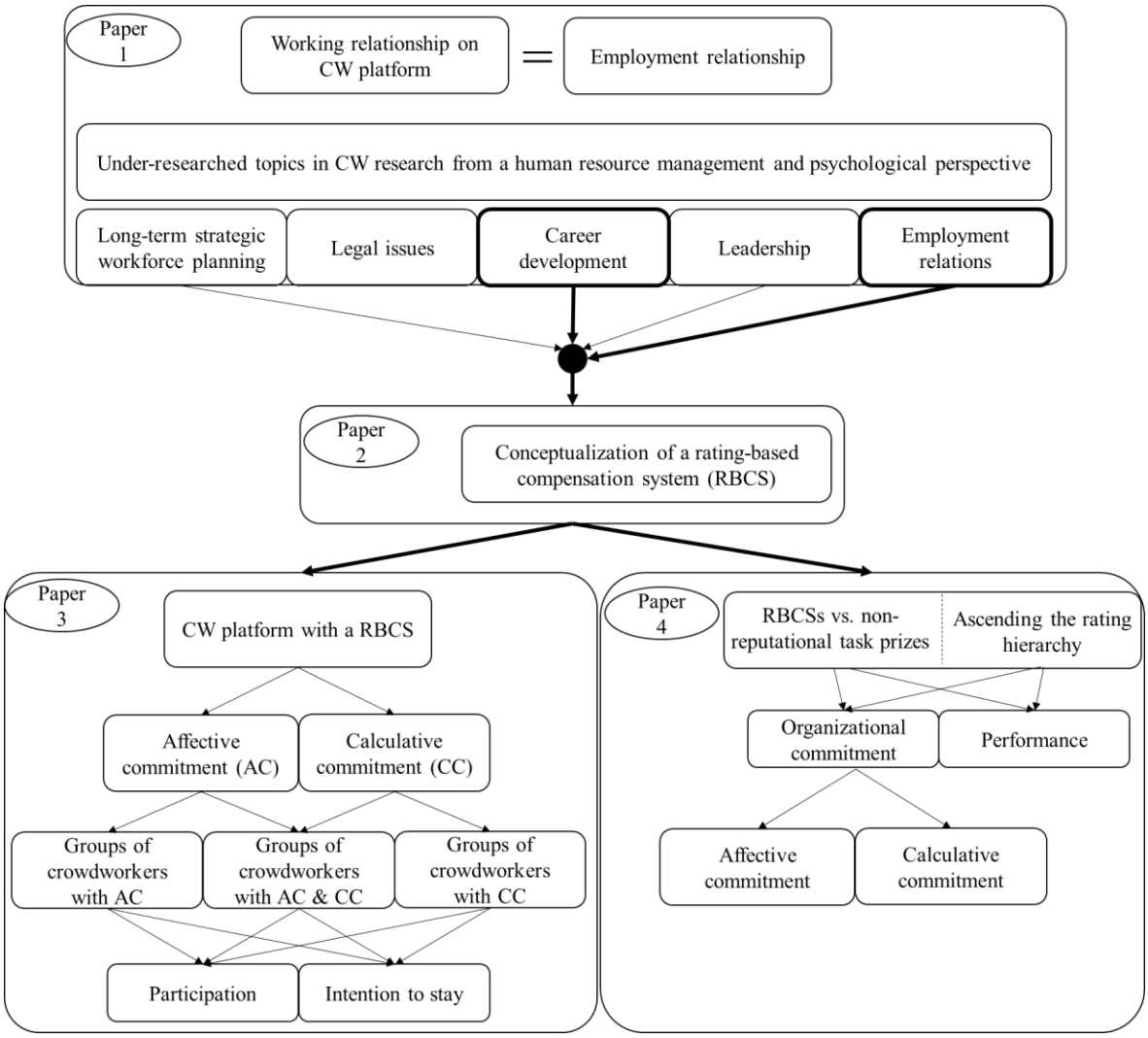


Figure 2. Overview of the four papers in this dissertation and how they relate to each other

3 Methodology

The evidence for the research questions in all four papers comes from three different datasets collected by the authors of these papers and analyzed using both qualitative and quantitative methods. The datasets are described separately in this section because Paper 1 is based on 118 codified empirical studies of CW-as-employment relationship, Paper 2 is based on 32 codified German-speaking CW platforms with and without a RBCS, while Papers 3 and 4 are based on an interdisciplinary questionnaire dataset of 803 crowdworkers from four German-speaking CW platforms. Like the datasets, the methods used to analyze them differ significantly and are discussed in the context of the explanation of each dataset. Despite the closeness of the content to the four papers, the following serves to clarify the results of the papers in the next section.

3.1 Literature data set

The data for the content analysis in Paper 1 are based on 118 empirical primary studies on CW-as-employment relationship from a HRM and industrial and organizational psychology perspective (Hemsen et al., 2021). These studies were distilled from an original total of 1027 studies by applying three selection criteria to each primary study: First, the study had to report research on the construct of CW. Second, it had to show an emphasis or at least allow references to the employment relationship studied in HRM and psychology. Third, it had to present empirical work, either qualitative or quantitative. In addition, the authors expanded the search to include papers published in conference proceedings that potentially addressed the topic, as well as relevant primary studies based on the authors' previous individual research. As a result, 118 empirical primary studies on the CW-as-employment relationship remained. For each of the studies, the authors collected and codified general information about the article, information about the sample in terms of the platform(s) and crowdworkers studied, and details about the research design including the independent, dependent, moderating, and mediating variables of the research models examined.

A key outcome of Paper 1 is an overview of researched and under-researched topics that have been examined in empirical CW research. The authors documented the constructs that these studies included in their research models and then applied a bottom-up approach by grouping related constructs reported in the studies into broader topical areas on the topic of employment relationships. Subsequently, the topical areas are grouped into an Input-Process-Output (IPO) model and relate to either the platform, the tasks, or the crowdworker. However, the client is not highlighted separately in this model, as the task dimension more comprehensively addresses all elements related to the source of the tasks, namely clients, their design and processing. As a result of the two-way distinction, which distinguishes three IPO sections and three perspectives, the authors essentially propose a stacked version of three traditional IPO models. Like other IPO models, it does not show causality or warrant predictions (Pedersen et al., 2013). But it can help distinguish the main antecedents, components, and outcomes of the CW process, as the IPO components essentially reflect the independent variables of a research model in the input dimension and the dependent variable in the output dimension, while the processes are the mediating and moderating factors. In a final step of analysis, a bibliometric network analysis was performed to classify the IPO model using the "visualization of similarities" option in the VOS software package (van Eck & Waltman, 2010). Based on the codified empirical work, it visualizes how often each topical area was discussed, how often it was combined with other

areas, and how these areas relate to each other.

Despite a detailed codification of the literature, no systematic meta-analysis was performed, as this would require the included empirical studies and their datasets to be sufficiently comparable (Cooper, 2015). This means that the underlying research questions, the platform environments with their task specializations and target groups, and the research models were very diverse. This precluded a meta-analysis within the scope of Paper 1. Nevertheless, the IPO model combined with the bibliometric network analysis provided and discussed a comprehensive overview of empirical work on the CW-as-employment relationship, which had not been systematically discussed from an HRM and psychological perspective to this extent before.

3.2 Platform data set

The conceptualization of RBCSs in Paper 2 is based on a dataset containing information from 32 CW platforms in the German-speaking CW market (Hemsen, 2021a). Three criteria were used to select these platforms. First, according to the previous definition, an intermediary platform mediates digital tasks via an open call and direct the working conditions between their registered crowdworkers and their clients. This criterion ensures that no crowdworker has an employment contract with a participating party, as there are also organizations that set up an internal platform for their employees to bridge idle time or facilitate interdepartmental projects. Some of these internal platforms are also available to an external crowd, such as the “Telekom Prediction Markets” (originally “Telekom Prognosemärkte”) platform of the German telecommunications company T-Systems Multimedia Solutions was. However, this particular platform is no longer available and has been integrated into the company's other range of services. Second, the platform financially compensates each satisfactorily completed task, which ensure only platforms for digital gainful work. Third, it has a German-speaking web interface to improve the comparability of these platforms as they target crowdworkers with similar expectations of working conditions and pay. The German CW market was of particular interest as this research was funded by the Ministry of Culture and Science of the German State of North Rhine-Westphalia as part of the interdisciplinary research program "Digital Future". This is a collaboration between the University of Paderborn and the University of Bielefeld with researchers from the fields of business administration, computer science, sociology, psychology and engineering to research the topics of CW and data security and privacy in digitalized work processes.

A total of 32 CW platforms were identified and codified by 17 platform characteristics from six categories. The categories used include general characteristics about the platform as well as characteristics related to the task, the crowdworker selection process, the work situation, the solution, and the compensation. These distinctions have been identified by the CW literature from general typologies of crowdsourcing and CW platforms (i.e. Buettner, 2015; Chittilappilly, Chen, & Amer-Yahia, 2016; Ghezzi, Gabelloni, Martini, & Natalicchio, 2018; Leimeister, Zogaj, Durward, & Blohm, 2016; Pedersen et al., 2013) and extended with further general and compensation-related characteristics.

An exploratory approach similar to the preparation of a fuzzy set Qualitative Comparative Analysis (fs/QCA) was adopted to highlight certain combinations of platform characteristics that could be possible indications for the implementation of a RBCS (Hemsen, 2021a). In general, a fs/QCA is a qualitative method that builds on Boolean logic and set theory (Ragin, 2000, 2008; Schneider & Wagemann, 2012) used to uncover mechanisms consisting of certain combinations of necessary and sufficient conditions that explain an outcome in causally complex situations (Gerrits & Verweij, 2013). However, a full fs/QCA was not applied because the available platform characteristics as conditions would result in too many conflicting groups covering both platforms with a RBCS and platforms with a non-reputational fixed task prize system, thus no clear fs/QCA solutions (Hemsen, 2021a). One possible reason could be missing characteristics that were not included in the dataset because they were not considered relevant, present, or available. Although no mechanisms can be derived from the dataset to explain why a platform might have implemented a RBCS, an exploratory approach that examines the common characteristics that particularly distinguish platforms with a RBCS provides a meaningful basis for understanding the circumstances for implementing such a system (Hemsen, 2021a). Therefore, an exploratory approach was chosen that included some steps from a fs/QCA. In this approach, the software "fsQCA" of Ragin and Davey (2016) was used to select those characteristics that minimize the number of platforms in groups that include both platforms with a RBCS and platforms with a non-reputational fixed task prize system. Thus, to the extent possible, this approach generated platform groups with certain characteristics that included only platforms with the same type of compensation system. Seven platform characteristics stand out from the original 17 characteristics in the platform overview. This subset of seven platform characteristics was then used as the basis for interpretation about common characteristics and circumstances of the studied platforms with a RBCS and platforms with non-reputational fixed task prize systems.

3.3 Interdisciplinary questionnaire data set

Papers 3 and 4 are based on the same cross-sectional survey of 803 crowdworkers from four German-speaking CW platforms, but use different subsets of it. For this reason, the overall dataset is described first, followed by the respective subsets and the methods used in the papers.

The questionnaires survey was also part of the interdisciplinary research program “Digital Future” (Giard et al., 2019). Researchers from business administration, computer science, sociology, psychology, and engineering, created it to comprehensively address topics related to working conditions and employment relationships in CW. The questionnaire was offered online as a paid task on four German-language CW platforms, one of which specializes in texting tasks, one in simple and repetitive tasks called microtasks, one in location-based or mobile microtasks, and one in testing software and web interfaces. It includes 71 questions, was conducted anonymously, and was closed on the platform once 200 crowdworkers had answered the questionnaire. After reviewing the data, checking the responses of crowdworkers who take less than 10 minutes to answer the survey for conspicuous response patterns, and excluding crowdworkers who failed the attention check, only 9 crowdworkers were excluded due to failing the attention check. Accordingly, the data quality can be described as good. In total, the data consists of 803 surveyed crowdworkers, of which 204 were registered on the text creation platform, 195 on the microtask platform, 198 on the mobile microtask platform, and 206 on the testing platform. Overall, it provides different insights into the CW as an employment relationship and its working conditions from different perspectives. Further information on the processes on these platforms additionally resulted from the continued exchange with some of the platform providers involved.

Based on this dataset, Paper 3 focuses on the subset of 204 crowdworkers of the text creation platform. This specific platform reports more than 6,500 registered crowdworkers and the service is only available in German-speaking countries, as the platform specializes in German texts. By focusing on this platform and conducting a case study, Schneider and Hemsen (2021) were able to examine a platform that is highly specialized in a challenging task type, which, according to the platform provider's own statements, seeks continuous relationships with qualified crowdworkers and has implemented a RBCS with star visualizations for this purpose.

To analyze this subset, the empirical analysis in Paper 3 proceeds in several steps. First, fs/QCAs were conducted to examine which combinations of needs and satisfaction with the platform's compensation system are sufficient by computing two different fs/QCAs, one for affective commitment and one for calculative commitment as outcome variables. This was

performed because fs/QCA is used to derive, via Boolean logic and set theory, how different conditions combine to a number of causal paths, each of which sufficiently explains a particular outcome (Ragin, 2000, 2008; Schneider & Wagemann, 2012). Furthermore, configurational analysis stresses the concept of equifinality (Fiss, 2007; Misangyi, Greckhamer, Furnari, Fiss, Crilly, & Aguilera, 2017), which refers to a situation where "a system can reach the same final state, from different initial conditions and by a variety of different paths" (Katz & Kahn, 1978: 30). In many ways, this fits better with the configurational understanding of organizations and also allows for a more nuanced appreciation of how different causes interact to influence relevant outcomes (Fiss, 2007), describing a neo-configurational perspective (Misangyi et al., 2017). Second, the identified need-satisfaction combinations explaining commitment were additionally typologized by considering crowdworkers' tenure on the text creation platform, their star rating, and their employment status. This serves to enrich and increase the plausibility of the mechanisms. In a final step, the intention to stay as well as the participation of the identified groups of committed crowdworkers are tested by integrating the fs/QCA results into OLS regression analyses.

This mixed-methods approach in Paper 3, combining fs/QCA and regression analysis, was chosen for two reasons: First, it provides the opportunity to perform post-hoc analyses for specific subpopulations of observations that are part of the different fs/QCA solutions (Meuer & Rupietta, 2017). In this case, groups of crowdworkers who perceive affective commitment, calculative commitment, or both, due to different need-satisfaction combinations, are analyzed. This is also in line with the case-based focus strongly advocated in the QCA (Schneider & Wagemann, 2012). Moreover, it helps to uncover information within the identified configurations, thus improving descriptive and explanatory power (Meuer & Rupietta, 2017). Second, it provides the opportunity to control for alternative explanations by integrating the results of the fs/QCA into a regression analysis, for example, by additionally accounting for demographic factors not included in the QCA (Meuer & Rupietta, 2017). This allows the authors to address "[…] one of QCA's most important weaknesses: the limitation in the number of conditions that can be included in the model" (Meuer & Rupietta, 2017: 2071). Overall, this mixed-methods approach allows to make a contribution that would not have been possible with only one of the methods alone.

In contrast to Paper 3, the empirical analyses in Paper 4 by Hemsen (2021b) are based on the subset of all 378 crowdworkers who deal with text creation tasks. The surveyed crowdworkers report that text creation tasks are a recurring task type on all four platforms in the dataset. The

restriction resulting from the reduction in observation studied was chosen to increase comparability across crowdworkers from platforms with different specializations in particular. By additionally controlling for person- and platform-related circumstances in the regression analyses and applying an additional method based on propensity score using inverse probability weights, this subset allows for comparisons between crowdworkers from platforms with a RBCS and crowdworkers from platforms with a non-reputational fixed task prize system as well as comparisons of differently rated crowdworkers within a platform. Of particular interest were the outcome variables affective commitment, calculative commitment, and, as a measure of performance, hours worked per week on the platform offering the questionnaire to the participating crowdworker.

The analysis performed for these comparisons consists of two quantitative methods, ordinary least squares (OLS) regression analysis and inverse probability-weighted regression adjustments (IPWRA). This combination was chosen to control for alternative explanations in particular, as IPWRAs take the contrasts of the mean treatment-specific predicted outcomes into account. Therefore, IPWRAs account for the common problem that each subject is observed in only one of the potential outcomes (Imbens & Wooldridge, 2009). The analysis in this paper proceeded as follows: First, OLS regression analyses were used to test the hypotheses in Paper 4. Regression analyses were conducted using both linear regression models consisting of independent and dependent variables only, and multiple linear regression models that additionally included person- and platform-related circumstances, with employment status, whether CW is the primary occupation, gender, and age as person-related information, and tenure on the platform, additional platform used, and task availability as platform-related information. This allows to test whether the effects observed in the linear regression models are retained in the multiple regression models and whether there are changes in the estimates, thereby accounting for the heterogeneity of crowdworkers. Further, because of the different measurement scales, the regression analyses were calculated using standardized values of the respective variables. Second, in addition to OLS regression analyses, IPWRAs were conducted for hypothesis testing. Unlike OLS regression analyses, IPWRA estimators use a three-step approach to estimate treatment effects (StataCorp. L.L.C., 2019). First, the parameters of the treatment model (i.e., the model used to predict treatment status) are estimated and the inverse probability weights are computed. Second, the estimated weights are used to adjust the weighted regression models of the outcome for each treatment level and obtain the treatment-specific predicted outcomes for each subject. Finally, the means of the treatment-specific

predicted outcomes are calculated, and the contrasts of these means provide the average treatment effect estimates. Furthermore, the resulting estimators are considered consistent when either the treatment or outcome model is correctly specified (Imbens & Wooldridge, 2009). In summary, combining OLS regression analysis and IPWRAs can uncover potential variation in methods and better account for crowdworkers' heterogeneity.

4 Presentation of papers

In this section, all the papers included in this dissertation are presented in more detail with special intention to their results. Furthermore, Tables 2 to 5 list all persons involved in the creation of the papers and their contributions as well as the publications at scientific conferences and in scientific journals.

4.1 Hemsen, Schulte, Schlicher & Schneider (2021)

Paper 1 not only provides the basis for the following three papers, but also fills the gap of a comprehensive overview of empirical research on CW-as-employment relationship. In doing so, this paper addresses three questions: What do we know about crowdworkers' employment relationship from empirical research concerning e.g. pay, working conditions, work design, motivation, satisfaction and commitment – in short, the topical areas that make up the employment relationship? Building on this, which problems in this relationship are similar to, and which are different from regular employment? Are any topics under-researched? To answer these questions, 118 empirical primary studies on CW were identified and systematically reviewed, drawing on theoretical insights from human resource management and industrial and organizational psychology. By creating an Input-Process-Output model and applying a bibliometric network analysis, it was possible to identify which topical areas of CW-as-employment relationship have already been covered and which areas are still under-researched. The topical areas discussed in this paper include incentives, task design, platform's work environment, the crowdworker's traits, their qualifications, and their work records as inputs; social exchange, condition appraisal, effort, affect, motivation, enjoyment, self-efficacy as process-level phenomena; and job satisfaction, commitment, participation, performance, and crowdworker-task fit as outputs. Reviewing these topical areas shows that CW research tends to focus on issues related to optimizing the task process from the platforms' perspective rather than on topics of interest from the crowdworkers' perspective. In particular, topics such as job satisfaction, affect, enjoyment during CW, or commitment to a platform play a minor role in the literature. Further, it is noticeable that most primary studies examine main effects rather

than moderation and mediation mechanisms. This is particularly reflected in the fact that most studies focus on specific outputs, namely participation, quantitative performance, and qualitative performance, and examine how these are related to a small number of specific inputs, often task design, crowdworker traits, their qualifications, and monetary incentives. Based on this evidence and examined relations to research on employment relationships, five other important but under-researched fields in CW stand out, namely long-term strategic workforce planning, legal issues, leadership styles, careers on platforms, and employment relations. CW thus raises old problems in new and partly complex variations, on account of higher coordination efforts, fewer legal boundaries, crowdworkers' paradoxical social roles, and interactions with platform and clients. Overall, this paper creates a comprehensive overview of current empirical CW research and links it to core themes of existing research on the employment relationship. Detailed information on the creation of Paper 1 can be found in Table 2.

Table 2. Involvements in Paper 1 and its publications at scientific conferences and in scientific journals

Hemsen, Paul; Schulte, Julian; Schlicher, Katharina D. & Schneider, Martin R. (2021). Crowdsourcing for paid work as a new form of employment relationship: A content analysis	
Content	Responsible person(s)
• Elaboration of research questions	Hemsen, Schulte, Schlicher
• Creation of the theoretical framework	Hemsen, Schulte, Schlicher
• Collection and codification of empirical primary studies	Hemsen, Schulte, Schlicher
• Data preparation and structuring	Hemsen
• Creation of the bibliometric network	Schulte
• Interpretation and discussion of results	Hemsen, Schneider
• Article writing	Hemsen, Schneider, Schulte
• Feedback and comments	Schlicher

Table 2. Continued

Hemsen, Paul; Schulte, Julian; Schlicher, Katharina D. & Schneider, Martin R. (2021). Crowdsourcing for paid work as a new form of employment relationship: A content analysis	
Presentations at scientific conferences	Speaker
• 09/2019: ILERA European Congress 2019 - Perspective of Employment Relations in Europe, Düsseldorf (Germany)	Schulte
• 02/2020: 1st LISER-IAB Conference on Digital Transformation and the Future of Work, Esch-sur-Alzette/Belval (Luxembourg)	Hemsen
Status	
• 01/2021: Submitted to the International Journal of Management Reviews. Status: 01/2021 rejected	

The other three papers in this dissertation touch to some extent four of the five under-researched topics, with the exception of legal issues, but contribute in particular to the aspect of career opportunities and employment relations on CW platforms. This is because the papers show that CW platforms are willing to commit to skilled crowdworkers by implementing a RBCS and therefore, offering intern career opportunities and an ongoing relationship through a kind of an internal labor market. This allows CW platforms to not only actively lead crowdworkers to achieve set goals that are relevant to the platform and the crowdworkers, but also to consider strategic workforce planning as crowdworkers are more likely to stay. How RBCS are composed in detail, which mechanisms generate commitment to a CW platform with a RBCS, and how effective such a long-term compensation system is, is examined in the following three papers.

4.2 Hemsen (2021)

Although several CW platforms already operate a RBCS and were even the subject of the Federal Labor Court's decision on whether a crowdworker can be an employee, RBCSs on CW platforms are not the subject of current research. Therefore, Paper 2 refers to the following three questions to promote the understanding of such a system: How are RBCSs composed in terms of used performance and behavior evaluation criteria, visualizations of status and designated incentives? What are characteristics of CW platforms with a RBCS? How may a RBCS matters for crowdworker’s performance on the platform and their commitment to the platform? First evidence comes from an overview of 32 examined German-speaking platforms with a RBCS and platforms with non-reputational fixed task prize systems. Based on this overview, Paper 2

introduces the concept to the CW literature by explaining its basic composition and identifying characteristics of platforms with and without a RBCS. It also reconstructs the logic of how a RBCS motivates and commits by drawing on concepts developed for regular employment. In particular, the hierarchy of rating levels is shown to be related to Doeringer and Piore's (1985) concept of internal labor markets, and the associated gradual improvements in pay and working conditions over time are similar to the forms of deferred compensation described by Lazear (1990). The theoretical foundation how an internal platform hierarchy and its associated rewards set desirable goals for crowdworkers, and why these motivate and commit in the long run is based on the Locke and Latham's (2002) goal-setting theory. Overall, this paper presents RBCSs on CW platforms as an alternative to mostly short-term, non-reputational task prize systems and as a promising tool to attract, motivate, and commit crowdworkers to a platform, thus addressing incentive and commitment problems of CW platforms. Detailed information on the creation of Paper 2 can be found in Table 3.

Table 3. Involvements in Paper 2 and its publications at scientific conferences and in scientific journals

Hemsen, Paul (2021). How do rating-based compensation systems on crowdworking platform work? Providing long-term and reputational compensation for expert crowdworkers	
Content	Responsible person
• Sole authorship	Hemsen
• Feedback and comments	Schneider
Presentations at scientific conferences	Speaker
• 09/2018: Herbstworkshop 2018 der Wissenschaftlichen Kommission Personal des Verbandes der Hochschullehrer für Betriebswirtschaftslehre e.V. (Translated: Fall Workshop 2018 of the Scientific Commission Human Resources of the Association of University Teachers of Business Administration e.V.), Munich (Germany)	Hemsen
• 10/2020: 2nd Crowdworking Symposium – Ability, Motivation and Opportunities for digital work, Paderborn (Germany)	Hemsen
Status	
• To be submitted to a scientific journal	

4.3 Schneider & Hemsen (2021)

Building on Paper 2, Paper 3 addresses for the first time in this context the mechanisms that generate commitment to a CW platform with a RBCS; how identified groups of committed crowdworkers differ from each other in terms of the reasons why they are committed; and how two facets of commitment – affective and calculative (Meyer & Allen, 1991) – are related to crowdworker participation and intention to stay on a platform. To address these questions, the analysis is based on a cross-sectional questionnaire for 204 crowdworkers registered on a German platform that specializes in text creation. A mixed-methods design combining fuzzy-set Qualitative Comparative Analysis (fs/QCA) and OLS regressions was used and produces two main findings: First, six different combinations of motives and satisfaction with the platform's compensation system, in this case a RBCS, can be interpreted as causal paths to affective commitment, calculative commitment, or both types of commitment. For example, a group labeled as rank-and-file crowdworkers (n=117) is highly motivated by additional income and not highly motivated by pastime, which sufficiently explains their high calculative commitment to the text creation platform. Further, this group contains mostly self-employed people and 53 percent of these crowdworkers report that CW is their main occupation. Second, affective commitment to the surveyed CW platform is related to crowdworkers' intention to stay on the platform for at least another year, while calculative commitment is related to participation in terms of hours worked per week. Overall, this paper extends the CW research on incentives and commitment (in particular Boudreau, Lacetera, & Lakhani, 2011; Gupta & Kim, 2007; Liang, Wang, Wang, & Xue, 2018; Mason & Watts, 2009; Schulten & Schaefer, 2015) by focusing on RBCSs geared towards long-term commitment and by adapting the distinction between affective and calculative commitment (Meyer & Allen, 1991; Shore, Tetrick, Lynch, & Barksdale, 2006) to the platform context. Detailed information on the creation of Paper 3 can be found in Table 4.

Table 4. Involvements in Paper 3 and its publications at scientific conferences and in scientific journals

Schneider, Martin R. & Hemsen, Paul (2021). Freelancers who stay? A fuzzy-set qualitative comparative analysis of affective and calculative commitment among crowdworkers to a platform	
Content	Responsible person(s)
• Elaboration of research questions	Schneider, Hemsen
• Creation of the literature review and theoretical framework	Schneider, Hemsen
• Application of qualitative and quantitative empirical analyses	Schneider
• Interpretation and discussion of results	Schneider, Hemsen
• Article writing	Schneider, Hemsen
Presentations at scientific conferences	Speaker
• 07/2019: 1st Crowdworking Symposium „Understanding Digital Labor Markets", Bremen (Germany)	Schneider
• 03/2020: 82nd Annual Conference of the Association of University Teachers of Business Administration e.V. "Digital Transformation" (original conference name: 82. Jahrestagung des Verbandes der Hochschullehrer für Betriebswirtschaftslehre e.V. "Digitale Transformation"), online conference	Hemsen
• 07/2020; 36th EGOS Colloquium: Organizing for Sustainable Future: Responsibility, Renewal & Resistance, online Conference	Schneider
Status	
• 10/2019: Submission to the Journal of Business Research. Status: 01/2020 rejected	
• To be submitted to a scientific journal	

4.4 Hemsen (2021)

The final Paper 4 sheds light on the effectiveness of such a compensation system in terms of crowdworkers' weekly hours worked and their affective and calculative commitment to the CW platform. Specifically, it examines whether crowdworkers report higher affective and calculative commitment to a platform and work more weekly hours when the platform operates a RBCS instead of a non-reputational fixed task prize system; and whether both commitment facets and their hours worked per week increase with their rating level on a platform with a RBCS. Similar to Paper 3, the analysis in this paper is based on the questionnaire dataset, but considers all crowdworkers (n=378) who participate in text creation tasks from four different CW platforms. Text creation tasks were particularly selected because they are a recurring task type on all four platforms studied. Furthermore, of these four platforms, two have implemented

a RBCS for text creation tasks, while the remaining two platforms use a non-reputational fixed task prize system. By testing the hypotheses with regression analysis (OLS) and inverse-probability-weighted regression adjustments (IPWRA) on this data subset, two main findings emerge: First, platforms with a RBCS are associated with significantly higher affective committed crowdworkers and more hours worked per week than platforms with a non-reputational fixed task prize system. In contrast, no significant effect on the calculative commitment was found in the platform comparison. One possible reason could be that especially the crowdworkers on platforms with non-reputational fixed task prizes perceive calculative commitment independent of the compensation system. This is because they may lack other income-generating alternatives and are therefore willing to accept unbalanced working conditions and relatively low pay. Second, however, each higher rating level is associated with a continuous increase in both commitment facets and to some extent continuously encourages more weekly working hours within the text creation platform. But unlike the commitment facets, the weekly working hours stagnate at the second highest rating level and decrease at the highest possible rating level. For the most part, this performance progression was to be anticipated, as there is little sufficient incentive to improve, particularly at the highest possible rating level. However, due to direct performance monitoring, a certain level of performance must always be maintained or a downgrade may take place. Overall, the pattern shows strong support for the idea that the RBCS draws on mechanisms familiar to regular employment, namely internal labor markets and deferred compensation. Therefore, a RBCS seems to be a promising tool for CW platforms to address their commitment and incentive issues and to improve the working conditions of their registered crowdworkers. Detailed information on the creation of Paper 4 can be found in Table 5.

Table 5. Involvements in Paper 4 and its publications at scientific conferences and in scientific journals

Hemsen, Paul (2021). Rating-based compensation systems as a commitment tool on crowdworking platforms. An empirical analysis of four platforms	
Content	Responsible person
• Sole authorship	Hemsen
• Feedback and comments	Schneider

Table 5. Continued

Hemsen, Paul (2021). Rating-based compensation systems as a commitment tool on crowdworking platforms. An empirical analysis of four platforms	
Presentations at scientific conferences	Speaker
• 07/2019: Crowdworking Symposium „Understanding Digital Labor Markets", Bremen (Germany)	Hemsen
• 09/2019: ILERA European Congress 2019 - Perspective of Employment Relations in Europe, Düsseldorf (Germany)	Hemsen
• 09/2019: Herbstworkshop 2019 der Wissenschaftlichen Kommission Personal des Verbandes der Hochschullehrer für Betriebswirtschaftslehre e.V. (Translated: Fall Workshop 2019 of the Scientific Commission Human Resources of the Association of University Teachers of Business Administration e.V.), Munich (Germany)	Hemsen
Status	
• To be submitted to a scientific journal	

5 Discussion and conclusion

As shown, this dissertation is particularly dedicated to the exploration of RBCSs and how this particular type of compensation system works on CW platforms as a promising tool to motivate crowdworkers in the long run and to foster a continuous and reciprocal relationship between platforms and crowdworkers. This additionally allows researchers to emphasize CW as an employment relationship and allows them to draw on the extant body of research on employment relationships from the perspective of personnel economics and psychology to address incentive and commitment issues of CW platforms in particular. What makes this so appealing is the apparent paradox of employment relationships and a long-term form of compensation system in the CW setting. A form of work organization originally based on the idea of a highly flexible online labor market without employment contracts and primarily short-term interactions between three parties (Howe, 2006; Schulte et al., 2020). Moreover, this work is not only aimed at an academic audience interested in CW, but is also of practical relevance to platforms struggling with incentive and commitment issues, as well as political and legal decision makers, as the recent decision of the German Federal Labor Court is likely to lead to further action. Therefore, this dissertation contributes to the understanding of various parties on the under-researched topics of RBCSs and employment relationships in CW from a

predominantly personnel economics perspective.

The contribution of this dissertation is multifaceted. Particularly new to CW research is the designation and extensive introduction of RBCSs as a long-term compensation system, and thus the focus of the corresponding papers in this dissertation. Previous work has tended to focus on optimizing short-term task reward systems, for instance, by varying task prizes (e.g. Hsieh & Kocielnik, 2016; Lee, Chan, Ho, Choy, & Ip, 2015; Liu, Yang, Adamic, & Chen, 2014), paying additional bonuses (e.g. Ho, Slivkins, Suri, & Vaughan, 2015; Ming, Yiling, & Yu-An, 2013, 2014), using different payout intervals for the earned income (e.g. Ho et al., 2015; Ikeda & Bernstein, 2016) or even shifting from individual payouts to group incentives (Riedl & Wooley, 2017). Other studies also refer to non-cash awards (e.g. Feng, Jonathan Ye, Yu, Yang, & Cui, 2018; Goes et al., 2016; Goh, Pe-Than, & Lee, 2017), such as ratings, rankings, badges or leaderboards, given in recognition of a high level of accomplishment or performance (Rose, 1998). What these studies have in common is that they do not specifically address incentives to motivate or commit crowdworkers in the long run or consider incentives that combine monetary and non-monetary incentives. What also stands out in this dissertation is that the theoretical foundation of RBCSs and its logic is entirely reconstructed from the concepts of regular employment relationships, namely internal labor markets and deferred compensation, and additionally supported by the goal-setting theory from Locke and Latham (2002). Subsequently, the examination of the effectiveness of RBCS as a tool for crowdworkers' commitment and motivation in one of the included papers can also be considered novel, as it has not been done before. Also novel is the examination of mechanisms that sufficiently lead to commitment to a platform with a RBCS or a CW platform in general. The respective paper offers a promising approach to study commitment mechanisms on platforms of different specialization and to target specific groups of crowdworkers. It thus addresses the information asymmetry of platforms that do not reliably know much about the heterogeneity of their crowdworkers (Gadiraju et al., 2017).

Another contribution to CW research is the consideration of CW as an employment relationship and the related topic on the perception of commitment by users to an online platform. There is already work on whether and to what extent work-mediating internet platforms, including CW and crowdsourcing platforms, exhibit characteristics of a legal employer and thus an employment relationship (Bracha & Burke, 2016; Prassl & Risak, 2015; Stefano, 2016). A systematic content analysis of empirical work on CW-as-employment relationship from the perspectives of HRM and psychology, while new, complements the rather legal perspective of

previous studies by providing a comprehensive overview as a basis for further thinking in this direction. Part of previous research is also that users actually perceive an affective or emotional commitment to an online platform (Schulten & Schaefer, 2015) or identify with an online platform (Boons et al., 2015; Durward & Blohm, 2017; Fedorenko, Berthon, & Rabinovich, 2017). However, previous work does not differentiate between the various reasons to commit to or identify with a crowdsourcing or CW platform. This dissertation changes that by showing that the concept of the multidimensional organizational commitment of Meyer and Allen (1991) is indeed applicable to CW platforms, particularly the emotional and rational facets. Overall, this dissertation usefully extends CW research and demonstrates that transferring extant research on employment relationships can help uncover and explain known processes and information flows in the guise of CW.

This dissertation not only opens up new research questions that extend or build on this work, but also offers several implications for researchers, platform providers, and political and legal decision makers. Researchers studying CW or other arrangements for digital gainful employment should look more closely to existing work on established concepts and theories. This is because the goals of such platforms, whether the mere desire to run a profitable business or to offer certain services or products, are usually not new, nor are the sole processes and information flows used to achieve those goals (Puranam et al., 2014). What is usually new in this context is the rearrangement of these processes and information flows (Puranam et al., 2014). Accordingly, CW should be seen less as a completely new and disruptive form of work that threatens conventional employments, as Howe (2006) originally claimed. It is more appropriate to consider CW as a digital and thus easily and globally accessible variant of employment relationships.

Building on this work and the decision of the German Federal Labor Court, there are also implications for platform providers. Essentially, it implies that these platforms will have to rethink their strategy in the German market. This means that platforms have to decide whether they want to exit the German market, which seems unlikely, whether they want to distance themselves from RBCS, which could reduce the activity, performance or commitment of their registered crowd especially for sophisticated task types, or whether they want to come to terms with the potentially upcoming legal obligations. However, this work only provides a way for platforms to address incentive and commitment issues, but cannot provide credible advice on how these platform providers should actually behave in this situation.

The implications for political and legal decision makers are also mixed. On the one hand, this

work supports the statement that platform providers use means to activate and commit their users (Bundesarbeitsgericht, 2020). Also, it supports evidence that some platforms offer poorer working conditions and low pay compared to conventional employment (Brabham, 2008; Fieseler, Bucher, & Hoffmann, 2019; Franke, Keinz, & Klausberger, 2013). Such precarious work situations should therefore be addressed by political and legal decision makers. On the other hand, it can be considered common knowledge that internet platforms are interested in generating traffic on their website or commit their users. Therefore, such means should not be so surprising on CW platforms. Moreover, according to this dissertation, platforms that use a RBCS to attract, motivate, and retain their valuable crowdworkers tend to be highly specialized platforms for demanding task types that more appropriately compensate their expert crowdworkers (Hemsen, 2021a). Now, if platforms for sophisticated task types, which typically have only a tenth of the crowd of a microtask platform and, for example, a team of 30 permanent employees to manage their platform, are faced with employer obligations for potentially several thousand workers, poorly designed policies and legal regulations would hit the wrong platforms and thus also harm the source of income for thousands of workers. Therefore, it calls more for regulations on precarious work situations on CW platforms, but specialized platforms that work with expert crowdworkers in more reciprocal employment relationships must also be considered.

Of course, this work is not without limitations. Since the limitations of this dissertation are the sum of all the individual limitations of the four included papers, they are not listed individually here. A more detailed discussion of the limitations, how they were addressed individually, and what future research will result from them can be found in the respective papers. One point in particular, however, can be highlighted, namely the lack of longitudinal data sets in CW research. Research that is otherwise primarily based on exploratory or cross-sectional datasets would benefit greatly from such data (Zhao & Zhu, 2014).

Overall, this dissertation provides a scientific contribution to the current discussion on CW, particularly with regard to employment relationships and RBCSs to motivate and commit crowdworkers, and demonstrates the practical relevance of these under-researched topics. Whether platforms will distance themselves from commitment tools such as RBCSs to avoid legal liabilities will become clear in the coming months or years. Humorously put, in a worst-case scenario, this could make this dissertation and the papers it contains the first and simultaneously the last of its kind. Irrespective of this, it can be noted that public acceptance of CW is growing and the percentage of people working full-time on CW platforms is likely to

increase (Kuek, Paradi-Guilford, Fayomi, Imaizumi, Ipeirotis, Pina, & Singh, 2015). Accordingly, deeper insights into adequate digital work environments, whatever concept they may be based on, could pave the way for gainful work that is much more accessible to different groups of people.

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