Freelancers who stay? A fuzzy-set qualitative comparative analysis of affective and calculative commitment among crowdworkers to a platform[1]

Martin R. Schneider & Paul Hemsen

University of Paderborn, chair of personnel economics, Paderborn, Germany

martin.schneider@uni-paderborn.de; paul.hemsen@uni-paderborn.de

Abstract   "Crowdworking" (CW) seems to epitomize the highly flexible online world of work. Platforms offer tasks to the crowd, their registered freelancers or crowdworkers, and pay them on a task-by-task basis. But some platforms focus on tasks with considerable skill needs such as text creation and are therefore interested in engaging skilled crowdworkers on a more long-term basis. In this paper, we argue that such platforms incentivize and commit their crowdworkers through an ingenious "rating-based compensation system", we explore how affective and calculative commitment evolves among crowdworkers on one platform, and we test how commitment is related to participation and intention to stay. Based on survey data and a fuzzy-set qualitative comparative analysis (fs/QCA), we identify six groups of committed crowdworkers, each with a specific combination of needs and satisfaction with the platform's compensation system. Furthermore, we find that affective commitment is associated with a stronger intention to stay with the platform, and that calculative commitment is associated with more work hours on the platform (participation). In sum, this paper adapts the concept of organizational commitment to the crowdworking context, demonstrates how distinct groups of committed expert crowdworkers can be identified via the configurational fs/QCA method, and illustrates how rating-based compensation systems motivate and engage crowdworkers on a long-term basis.

1 Introduction

The idea of long-term commitment to a crowdworking platform seems to be a contradiction in terms. "Crowdworking" (CW) refers to paid online work on intermediary internet platforms (Schulte, Schlicher, & Maier, 2020). Such work includes microtasks such as typing numbers but also more complex tasks such as testing, designing or text creation. In each case, clients outsource a paid digital task to a platform, which displays them in an online call. Registered crowdworkers apply for tasks on a case-by-case basis, without being formally employed and without being committed to one particular platform. The platforms, in turn, have access to a large and potentially global workforce without having to enter into formal, long-term employment relationships. Hence, CW resembles an online-labor-market rather than an organization, and it appears to epitomize the emerging weightless and highly flexible world of online work.

At the same time, however, some platforms have established a "rating-based compensation system" (RBCS) that apparently encourages long-term commitment among crowdworkers (Hemsen, 2021). These receive an individual rating, ranging for instance from one to five stars, based on their past performance and behavior, typically in terms of the number of completed tasks or clients' quality evaluations. By achieving a higher rating, crowdworkers move up an "incentive hierarchy" (Auriol & Renault, 2001; Goes, Guo, & Lin, 2016) and usually receive better pay and are given access to more complex or more interesting tasks (Hemsen, 2021). Since it takes time to achieve the highest ratings, once they have done so, the crowdworkers have an incentive to stay with the current platform.

The emergence of RBCSs is not difficult to explain. Platforms specializing in tasks such as programming and text creation crucially rely in their success and survival on experts who are familiar with the platform's procedures and the clients' requirements (Boons, Stam, & Barkema, 2015; Schulten & Schaefer, 2015). Much like conventional employers, therefore, platforms need to attract and retain skilled crowdworkers. But unlike conventional employers, platforms do not offer their crowdworkers an employment contract and do not carefully screen and select crowdworkers (Gadiraju, Fetahu, Kawase, Siehndel, & Dietze, 2017). They typically erect only low barriers of entry, such as short qualification checks, before crowdworkers are allowed to register. As independent freelancers, crowdworkers are not required to participate regularly and are able to leave the platform without a notice period. Overall, platforms do not know much about their heterogeneous workforce and lack important means to commit valuable but potentially footloose crowdworkers to stay and to participate (Boons et al., 2015; Schulten

& Schaefer, 2015). These problems can effectively be solved by a RBCS (Hemsen, 2021). It produces information about the crowdworkers' performance record (participation and quality) and provides incentives for crowdworkers to remain engaged on the platform.

In this paper, we address three questions: First, what mechanisms generate commitment to a CW platform with a RBCS? Following Meyer and Allen (1991) we define commitment as a psychological state, which is important to study because it is likely to predict crowdworker attrition, performance, and participation. Second, can we identify groups of highly committed crowdworkers who differ from each other in terms of the reasons why they are committed? We distinguish different mechanisms or causal paths leading to commitment based on crowdworkers' needs and their satisfaction with the rewards offered by the platform's compensation system. Distinguishing types of workers is important because crowdworkers are more diverse than regular workers in terms of age, employment status and work motives (Giard et al., 2019). Finally, we ask: How is each of two components of high commitment – affective and calculative (originally termed "continuance") (Meyer & Allen, 1991) – related to crowdworker participation and intention to stay on a platform?

It is important to address these questions. CW is a growing phenomenon of the digital economy (Boudreau, Lacetera, & Lakhani, 2011; Fabo, Beblavý, Kilhoffer, & Lenaerts, 2017; Kittur et al., 2013; Kuek, Paradi-Guilford, Fayomi, Imaizumi, Ipeirotis, Pina, & Singh, 2015) offering work opportunities for a large number of diverse people including unemployed workers, self-employed workers, part-timers and pensioners (Bertschek, Ohnemus, & Viete, 2015; Durward, Blohm, & Leimeister, 2016). While CW is usually associated with poorly paid, short-term "gig" work, the emergence of the RBCS indicates that some segments of CW will bring forth long-term oriented work relationships and more generous opportunities to generate income.

But knowledge about these prospects is limited. More particularly, this paper is one of the first to focus on commitment among *paid* crowdworkers, and on RBCSs combining *monetary and non-monetary* rewards. Some work has been devoted in crowd*sourcing* to important phenomena that, arguably, are related to commitment as for example stronger participation (Feng, Jonathan Ye, Yu, Yang, & Cui, 2018; Goh, Pe-Than, & Lee, 2017; Ye & Kankanhalli, 2017) and better performance (Basili & Rossi, 2020; Goes et al., 2016; Peer, Vosgerau, & Acquisti, 2014), but no contribution in that literature has actually measured crowdworker commitment as a psychological state. Affective commitment has been studied in related contexts to ours, namely user commitment to websites (e.g. Casalo, Flavián, & Guinalíu, 2007; Schulten & Schaefer, 2015) and crowdworker commitment to temporary organizations

(Dwivedula, Bredillet, & Müller, 2013; Spanuth & Wald, 2017). But while this work exclusively focuses on *affective* commitment, we also study *calculative* commitment. Distinguishing different components has been shown to matter in recent work on commitment in regular employment (e.g. Meyer, Stanley, & Parfyonova, 2012; Schneider & Flore, 2019). In our context, it is not enough to focus on affective commitment because the RBCS is designed to generate calculative commitment by implementing a pay structure that over time raises the costs of leaving the platform. There is no previous work devoted specifically to this evolving compensation system. Recent work on "incentive hierarchies" in the platform context focuses on online communities that do not offer monetary incentives but only fame or glory to high-performing users (Goes et al., 2016; Liu, Schuckert, & Law, 2016b). However, the original work on an incentive hierarchy has emphasized the "complementarity between recognition and income" (Auriol & Renault, 2001). Of course, there is also a considerable literature on monetary incentives in CW but this focuses on short-term effects on participation rather than commitment (Hemsen, Schulte, Schlicher, & Schneider, 2021) and does not consider the hierarchical structure of rating systems (e.g. Basili & Rossi, 2020; Peer et al., 2014).

The analysis in our paper is based on questionnaire data for 204 crowdworkers registered with a German platform specializing in text creation. A mixed-method design combining fuzzy-set qualitative comparative analysis (fs/QCA) and regression analyses produces two main findings: First, six different combinations of motives and satisfaction with the compensation system can be interpreted as causal paths to high affective commitment, high calculative commitment or both components of commitment. Second, high affective commitment is related to crowdworkers' intention to stay on the platform for at least another year; high calculative commitment is related to their participation in terms of performed hours per week. Overall, the paper extends the literature on incentives and commitment in a crowd context (in particular Boudreau et al., 2011; Gupta & Kim, 2007; Liang, Wang, Wang, & Xue, 2018; Mason & Watts, 2009; Schulten & Schaefer, 2015) by focusing on an evolving RBCS 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.

2 Literature and hypotheses

2.1 Affective and calculative commitment

Organizational commitment has been studied since the 1960s (Becker, 1960; Spanuth & Wald, 2017), with various definitions and conceptions (Mercurio, 2015). In a seminal contribution,

Meyer and Allen (1991: 67) describe organizational commitment as "a psychological state that (a) characterizes the employee's relationship with the organization, and (b) has implications for the decision to continue or discontinue membership in the organization." We assume by implication that crowdworkers also develop different degrees of commitment to a platform. The commitment construct has helped to explain behavior in a range of contexts. Employee commitment has been studied to varying foci including organization, supervisor, work group or unit, profession or trade union (Meyer, 2016). Commitment has also been studied meaningfully for groups other than employees. For example, volunteers can be committed to organizations (McCormick & Donohue, 2019), and online users to virtual communities (Gupta & Kim, 2007; Schulten & Schaefer, 2015). Overall, adapting the commitment concept to the platform context seems legitimate and promising.

Meyer and Allen (1991) have argued that commitment is made up of three components, namely affective, calculative (originally termed "continuance") and normative commitment. Affective commitment can be defined as a crowdworker's "emotional attachment to, identification with, and involvement in" the platform (Meyer & Allen, 1991: 67). When affectively committed, crowdworkers continue to participate because they want to do so. Affective commitment has been described as the result of a social exchange, which involves open-ended relationship based on trust and socio-emotional goods (Shore et al., 2006; Tajfel, Turner, Austin, & Worchel, 2004; Vroom, 1964). There is some indirect evidence why crowdworkers may develop affective commitment to a platform. For example, customers or website users show more affective commitment when they experience personal relationships on, and immersion in, the website, and when they are satisfied with the process (Gupta & Kim, 2007; Schulten & Schaefer, 2015). These aspects are often influenced by gamification elements (Feng et al., 2018; Morschheuser, Hamari, & Koivisto, 2016), which are also part of the RBCSs we study. In particular, point rewards and feedback giving influence intrinsic motivation and participation among users of crowdsourcing platforms (Feng et al., 2018). In addition to the short-term experience that websites offer, more long-term factors may also play a role. Even in temporary organizations perceived career opportunities are related to affective commitment (Spanuth & Wald, 2017).

Calculative commitment can be defined by the degree to which crowdworkers need to stay with the current platform because they lack alternatives or find it too expensive to switch (Meyer & Allen, 1991: 67). Calculative commitment is therefore based on an economic exchange, which is a more short-time and specific transaction of pay against task performance (Blau, 1986; Shore et al., 2006). Calculative commitment is strongly influenced by personal characteristics such as skills and employment opportunities. RBCSs are designed to create strong calculative

commitment (Hemsen, 2021). This is because crowdworkers over time accumulate a better reputation, a higher rating and as a result access to certain benefits all of which they are unable to transfer to other platforms (Hemsen, 2021); they may become locked into their current platform (Schörpf, Flecker, Schönauer, & Hubert, 2017; Schulten & Schaefer, 2015).

The third component which Meyer and Allen (1991) discuss, namely normative commitment, is not included in our theoretical framework. We follow previous work focusing on affective and calculative commitment only (e.g. Gong, Law, Chang, & Xin, 2009; Schneider & Flore, 2019; Shore et al., 2006; Whitener & Walz, 1993). Blau (1986: 91) suggested it is "preferable to exclude conformity with internalized norms from the purview of the concept of social exchange". More specific reasons to leave out normative commitment follows from our research setting. Elements of an exchange that build obligations in employment relationships, such as costly training investments, intensive socialization and personal leadership, are relatively unimportant or are completely lacking in CW.

2.2   Rating-based compensation systems and commitment

RBCSs share some features with reputation systems in online communities, so some effects on motivation and performance may be inferred from previous work in this area. At the same time, the comparison shows that RBCSs follow a unique operating logic. They consist of four elements. None of them is new but the synergistic arrangement of their elements is (Puranam, Alexy, & Reitzig, 2014).

First, platforms have carefully *designed* their system by determining the criteria that influence the ratings, naming the categories and specifying thresholds (Hemsen, 2021). Hence, such rating systems differ from "status hierarchies" in which recognition evolves spontaneously based on visible contributions and positive feedback in online communities (Goes et al., 2016). The second characteristic is the *non-continuous, discrete nature* of ratings. They do not consist in the number of positive feedbacks or a continuous index of performance, but, rather establish a hierarchy defined by certain thresholds (Hemsen, 2021). Therefore, moving to a higher rating, for example from four to five stars, implies a leap that is similar to a promotion in an organization (Auriol & Renault, 2001; Hemsen, 2021). Third, RBCSs effectively bestow *immaterial rewards* on crowdworkers, in particular recognition, glory or reputation, because the ratings are public knowledge (Auriol & Renault, 2001; Goes et al., 2016; Hemsen, 2021). An important element in exhibiting status are gamification elements, namely visible points or stars as well as procedures of feedback-giving (Feng et al., 2018; Morschheuser et al., 2016). Fourth, the promotion also leads to some *material rewards* (Auriol & Renault, 2001; Hemsen,

2021). Crowdworkers with a higher rating usually receive higher pay rates, certain bonuses or access to particular tasks. In sum, a RBCS is designed and controlled by the platform, includes discrete steps in a hierarchy, and a promotion in the hierarchy is rewarded with both immaterial and material advantages.

These four characteristics interact to improve motivation, selection and commitment among crowdworkers. In an online context, intrinsic motivation matters, so gamification elements motivate users to contribute more (Feng et al., 2018). The thresholds can be interpreted as stretch goals that incentivize crowdworkers to participate and provide high-quality results (Hemsen, 2021). But as empirical work shows, incentive hierarchies that offer recognition but no material incentives lead to a discontinuity – once promoted, contributors' effort and quality are likely to level off or even drop (Basili & Rossi, 2020; Goes et al., 2016; Liu, Xia, Zhang, & Wang, 2016a). It is therefore important that recognition coincides with material rewards (Auriol & Renault, 2001). For example, when a higher rating leads to higher pay *per unit of effort* and more interesting tasks, crowdworkers continue to be motivated. The RBCS also improves the selection and the matching of crowdworkers to tasks. A minimum threshold for quality and participation can be utilized to exclude certain crowdworkers (Basili & Rossi, 2020; Gadiraju et al., 2017), and quality ratings can be used to predict service quality in a microtask CW context (Peer et al., 2014). By matching more complex jobs with a crowdworker's higher rating, skills and tasks are effectively aligned.

These effects on motivation and selection also help to explain why RBCSs generate *affective commitment*. In organizational commitment, the main factor fostering affective commitment is a positive work experience which the employer creates (Meyer & Allen, 1991). Crowdworkers often perceive a positive work experience including interesting tasks and constructive feedback as organizational support and will then reciprocate in various ways including affective commitment (Rhoades, Eisenberger, & Armeli, 2001). The systematic feedback and the ratings that signal recognition have been shown to increase intrinsic motivation consisting of self-recognition, self-effectiveness, playfulness and social bonds in crowdsourcing (Feng et al., 2018). Crowdworkers' self-efficacy is increased by the hierarchical matching of tasks and crowdworker ratings because crowdworkers are inhibited from picking tasks that exceed their skills. This is an important aspect because crowdworkers often overestimate their skills (Gadiraju et al., 2017).

The RBCS is also designed to generate *calculative commitment*. The main factor explaining calculative organizational commitment is the perception that alternative employment is less

attractive. This in turn is an outcome of available alternatives and the investment the worker has made in the current employment (Meyer & Allen, 1991). RBCSs encourage crowdworkers to make specific investments that lock them gradually into the relationship with the platform. This is because higher pay per unit of effort, more interesting tasks, and more recognition are achieved by moving up the hierarchy. But a promotion is based on past performance and a record of high-quality feedback, so ascending the hierarchy takes time (Hemsen, 2021). As the acquired rating is platform-specific, crowdworkers are unable to transfer them to other platforms (Hemsen, 2021); hence the effort to be promoted is a side-bet (Becker, 1960) and produces a lock-in effect. As a result, RBCSs operate much like internal labor markets that promise promotions based on a good performance record and match-specific investments (Hemsen, 2021).

2.3 Hypotheses

2.3.1 Types of crowdworkers

As we have argued, a RBCS generally fosters affective and calculative commitment. But how can we explain inter-individual differences? The literature offers no generally recognized model framework linking affective and calculative commitment to particular antecedents (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002; Spanuth & Wald, 2017). In general, affective commitment among employees was found to be strongly influenced by variables describing work experience, and calculative commitment by alternatives and investment. Both types of employee commitment are influenced by personal characteristics and are strongly related to various dimensions of job satisfaction (Meyer et al., 2002).

We assume that affective and calculative commitment are influenced by needs or motives on the one hand, and satisfaction with the platform's various aspects of the compensation system on the other. Füller, Hutter, Hautz, and Matzler (2014) pursue a similar approach. They argue that the motivation to participate in innovation contests on crowdsourcing platforms depends on personal motives and the incentives provided. Focusing on motives (or needs) and satisfaction (or how needs are met) is particularly helpful in our context. We study one platform, so the compensation system, the broad nature of the tasks, and how crowdworkers are led by the platform do not vary. Then, differences in commitment are likely to be the result of the interplay between needs and satisfaction. These are likely to differ substantially between individuals, despite the identical compensation system, because crowdworkers are heterogeneous.

Motives or needs have been studied to understand the initial decision to engage in CW (Zhao & Zhu, 2014; Zheng, Li, & Hou, 2011). Mirroring the distinction between economic and social exchange, motives can broadly be grouped into economic and socio-emotional needs. In terms of economic needs, people engage in CW in order to earn a living, supplement other types of income (Archak, 2010; DiPalantino & Vojnovic, 2009; Horton & Chilton, 2010; Stewart, Lubensky, & Huerta, 2010), to improve job prospects (Brabham, 2008, 2010), or to signal capability to potential clients or employers (Lakhani & Wolf, 2003). In terms of socio-emotional needs, people engage in CW because of their need for recognition (Brabham, 2008, 2010), general trust (Zheng et al., 2011), glory (Archak, 2010), social identification (Lakhani & Wolf, 2003), taking part in virtual communities (Brabham, 2010; Zhong, Wang, & Qiu, 2011), past experience (Bayus, 2010), perceived enjoyment and fun (Brabham, 2008, 2010; Stewart et al., 2010), individual skill development (Brabham, 2010; Zhong et al., 2011), curiosity and interest (Brabham, 2010), self-affirmation (Zhong et al., 2011), or just to pass the time (Paolacci, Chandler, & Ipeirotis, 2010).

How the various needs are met – crowdworker *satisfaction* – depends on how the platform's compensation system is perceived (Acar, 2018; Füller, Hutter, & Fries, 2012; Kittinger, 2015; Pee, Koh, & Goh, 2018; Schörpf et al., 2017). As the previous section has indicated, the RBCS appeals in various ways to the economic and socio-emotional needs. If crowdworkers, for instance, intend to signal capability, achieve self-affirmation, seek appreciation or recognition among peers or in relation to clients, then the individual rating and associated status cater for these needs (Chittilappilly, Chen, & Amer-Yahia, 2016; Goes et al., 2016; Schörpf et al., 2017). Broadly reflecting the distinction between economic and socio-emotional needs, we also distinguish between two areas of satisfaction with the compensation system, namely satisfaction with the pay aspects, such as pay levels and the extra pay crowdworkers receive through status promotion, and satisfaction with what we term "status aspects", such as recognition and more interesting tasks.

It can be assumed that needs and satisfaction combine in various but systematic ways. For example, a person who relies on CW as the only source of income will be committed to the platform in a calculative way if satisfied with the pay aspects of the platform's compensation system. Likewise, a personal looking mainly for ways to pass the time will be committed in affective ways if satisfied with the types of tasks. Hence, it is likely that the committed crowdworkers cluster into a limited number of distinct types. What we suggest, then, is a configurational approach (Misangyi, Greckhamer, Furnari, Fiss, Crilly, & Aguilera, 2017) and in particular a person-centered approach (Gabriel, Campbell, Djurdjevic, Johnson, & Rosen,

2018; Meyer & Morin, 2016), in order to develop an empirically-driven typology of committed crowdworkers. This is similar in spirit (though not in methodology) to deriving typologies or personas of users of platforms (e.g. Füller et al., 2014; Moser, Fuchsberger, Neureiter, Sellner, & Tscheligi, 2012). It is impossible to predict in detail which configurations of need-satisfaction combinations will evolve because numerous combinations are possible and because the configurations linked to affective commitment are likely to differ from those linked to calculative commitment. Therefore, our first hypothesis quite generally refers to the emergence of a limited number of distinct types of committed crowdworkers:

> *Hypothesis 1: There is a limited number of groups of crowdworkers who show high affective commitment or high calculative commitment or both, and each of these can be defined by their respective specific need-satisfaction combination.*

The need-satisfaction combinations are at least partly based on differences in personal circumstances. Therefore, to enrich and illustrate the nature of the typology, we examine descriptively how the different types of committed crowdworkers differ in a number of demographic and other variables. In particular, we analyze the employment status; whether CW is the crowdworker's main occupation; how long crowdworkers have been registered with the platform; and their rating on the platform's compensation system.

2.3.2 Participation and intention to stay

Much like organizational commitment, CW commitment may be related to important work outcomes. One such effect is a higher intention to stay with the platform. Previous work on platforms has not focused on such a link. The components model of employee commitment, however, implies that high affective and high calculative commitment will both be associated with lower turnover intention and, conversely, with higher intention to stay (Meyer et al., 2002; Meyer & Allen, 1991). A meta-analysis on employee commitment confirms the direction of these links but the statistical effect on turnover and related concepts is stronger and statistically more significant for affective commitment compared to calculative commitment (Meyer et al., 2002: 34). We expect a similar pattern in the CW context. Affective commitment is based on a social exchange and the fact that socio-emotional needs are met. In other words, when crowdworkers enjoy working with the platform, they will intend to stay on a more long-term basis. Conversely, calculative commitment is based on a more short-term economic exchange, so crowdworkers with calculative commitment will not report high levels of intention to stay. As a hypothesis, we expect a positive link only between affective commitment and intention to stay:

Hypothesis 2a: High affective commitment is associated with crowdworker's intention to stay with the platform.

As we have argued when deriving Hypothesis 1, affective commitment may evolve along various causal paths, producing different types of committed crowdworkers. Each causal path consists of a particular need-satisfaction combination. Therefore, we can vary Hypothesis 2a by referring to the combinations underlying affective commitment rather than affective commitment as such:

Hypothesis 2b: Need-satisfaction combinations sufficiently linked to strong affective commitment are associated with a higher intention to stay with the platform.

An important measure of performance for platforms is participation (Deng & Joshi, 2016; Ye & Kankanhalli, 2017), the fact that crowdworkers are not simply registered with the platform but rather engage on them by taking on tasks and putting in work hours. The components model predicts that affective commitment among employees will lead to higher job performance but that calculative commitment is unrelated or even negatively related with job performance (Meyer et al., 2002). This prediction is based on the idea that employees hold some discretion in deciding on their effort, so the motivation of crowdworkers with affective commitment will lead to better performance. However, we think that the links between components of commitment and CW participation differ from links with job performance in regular employment. First, even for regular employment the empirical studies yield effect sizes that are surprisingly low (Meyer et al., 2002: 34), which can be attributed to a strongly context-specific links (Mathieu & Zajac, 1990). Second, pay in CW is more directly linked to performance and task performance is closely tracked. Therefore, participation is not comparable to performance in a job. In particular, crowdworkers will not generate income from the platform unless they participate. Participation will therefore be higher for crowdworkers who are motivated to work because they seek additional income and because they rely on the specific platform – in other words, to the extent that they show strong calculative commitment. These reasons to participate are much weaker for crowdworkers who are affectively committed and, for example, work for the mere fun of doing the tasks. We therefore expect links with calculative commitment summarized in Hypotheses 3a and 3b:

Hypothesis 3a: High calculative commitment is associated with more work hours (participation).

Hypothesis 3b Need-satisfaction combinations sufficiently linked to strong calculative commitment are associated with more work hours (participation).

Overall, we suggest a conceptual model that explains how crowdworker commitment comes about on a platform that brokers complex tasks and offers a RBCS fostering more long-term commitment (Figure 1): Individuals differ in terms of their personal circumstances such as employment status, main occupation, tenure and experience or reputation. They therefore engage in CW for various reasons that range from looking for a convenient pastime to making a living. Depending on their needs and how satisfied they are with the platform's compensation system (need-satisfaction combination) they will differ not only in the degree but also in the kind of commitment they show, affective or calculative. The types of commitment, in turn, will influence in particular ways individual participation and intention to stay on the platform.
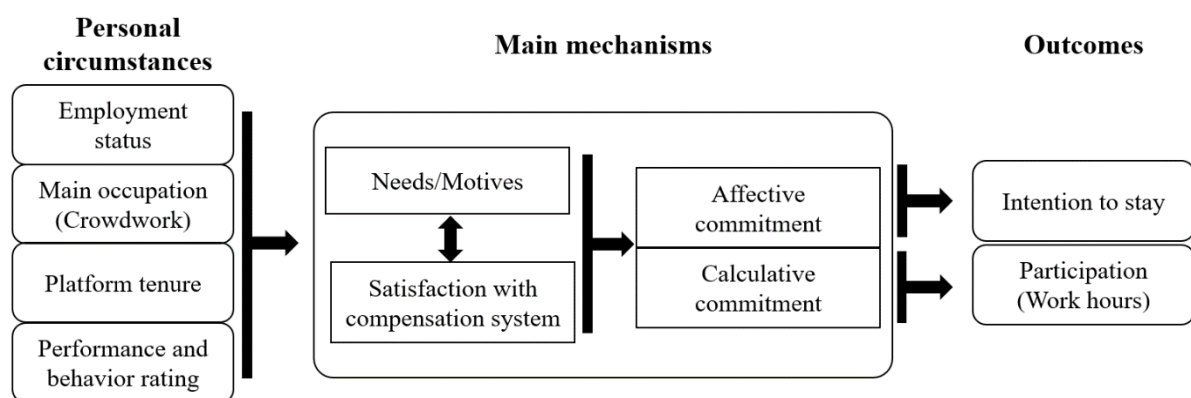
Figure 1. Theoretical framework illustrating mechanisms leading to commitment and effects of commitment

3 Data and methods

3.1 Research context

The empirical analysis examines crowdworkers registered with one particular platform that specializes in commissioning text creation. Focusing on a single platform is more suitable than a multi-platform research design for two reasons. We are interested in unearthing various need-satisfaction combinations that are linked to commitment and performance; in order to demonstrate that a range of such combinations can be found even in comparable CW settings, it is helpful to hold constant the compensation system to which crowdworkers are subjected. Furthermore, we addressed these questions also to develop managerial implications for platforms who are interested in fostering more long-term relationships with their crowdworkers. A single-platform design permits us better to illustrate how groups of committed and high-performing crowdworkers can be identified.

The platform under study – we call it TEXTPLAT – is one of four German-speaking platforms that agreed to participate in a questionnaire survey on various topics, including working conditions and employment relations in CW, in November and December 2018 and May and Junie 2019 (Giard et al., 2019). It is an ideal case for our purpose because it operates a sophisticated RBCS, the details of which were explained to us by one of the platform's founders in various interactions. When talking to the co-founder, it also became clear that the compensation system mainly serves one company goal, namely building long-term relationships with expert crowdworkers who are able to cope with the various complex writing tasks which the platform brokers. In sum, TEXTPLAT represents platforms that broker sophisticated tasks and try to attract and retain crowdworkers with a RBCS.

Founded in 2010, TEXTPLAT reports more than 6,500 registered and independent authors. The platform's service is only available in German-speaking countries, as the platform specializes in German texts. These are about topics such as finance and insurance, lifestyle, medicine, industry and crafting; writing product descriptions and guides, management consulting, and press releases; and the translation and interpretation of texts in different languages from or into German. Similar to other platforms, TEXTPLAT has standardized its processes, from a client outsourcing a task to its successful completion by a crowdworker. Crowdworkers are free to choose and apply for tasks announced on the platform. The submitted texts are evaluated by the platform and by the client based on content and specifications, spelling and grammar, form of expression and legibility, as well as communication and timeliness. A satisfactory text is compensated by a predefined price per word. The price per word along with bonuses and the availability of future tasks all depend on the author's rating. It may be either of six levels, namely 2, 3, 4, 4+, 4++ and 5 stars. By fulfilling or failing to meet specific requirements an author will be promoted or downgraded. The use of the platform is without contractual obligations and without a direct charge for the authors but from the word price that the platform bills to clients it deducts a considerable share for offering a work environment, mediating between authors and clients, and operating as trustee.

3.2   Measures, data and steps in the analysis

Data were collected via an online survey, which was administered by posting a paid task to four platforms including TEXTPLAT. Paying crowdworkers to complete a questionnaire has become an accepted approach for data collection in consumer research and in research on crowdsourcing (Bertschek et al., 2015; Brabham, 2010; Leimeister, Huber, Bretschneider, & Krcmar, 2009). In our study, registered users who happened to see the posting were free to

complete the questionnaire. As soon as 200 crowdworkers had completed the survey, it was closed. As a result, the sample is dominated by more active users of TEXTPLAT. Hence, the sample is representative not of all the platform's crowdworkers but of their more active crowdworkers who participate regularly. Since this is the group which the platform is interested in attracting, and since we try to uncover various paths to high commitment and performance within that group, the sample though non-representative is still highly suitable for our purposes.

The survey included 71 questions, many more than we used in this study. It took the 204 crowdworkers who responded 26 minutes on average to complete the questionnaire (standard deviation was 21 minutes). In the survey we used established scales available in German language whenever possible and adapted them to the platform context. As we were interested in the particular motives to do CW and in how satisfied crowdworkers are with the TEXPLAT's particular compensation systems we developed our own, context-sensitive scales for these constructs.

Calculative commitment was measured by applying the German version (COBB: "Commitment Organisation, Beruf und Beschäftigungsform"; translated: "commitment organization, profession and form of employment") (Felfe, Six, Schmook, & Knorz, 2014) of the organizational commitment questionnaire of Meyer, Allen, and Smith (1993). The scale comprises four items with five-point scales one of which reads in English translation: "It would be very hard for me to leave my platform right now, even if I wanted to". The wording has been slightly adapted in this and other items to fit the platform context. Cronbach's standardized alpha for this scale is 0.82.

In measuring a*ffective commitment,* we did not follow COBB, since a pretest showed that items framed for regular employees in organizations are not meaningful to crowdworkers. Instead, it was measured by the German short inventory (G-OCQ) (Maier & Woschée, 2014) of the Organizational Commitment Questionnaire (OCQ) of Mowday, Porter, and Steers (1982). Again wording has been changed slightly to fit the platform context. The scale includes nine items with five-point scales, one of which reads in English translation: "I am willing to put in a great deal of effort beyond that normally expected in order to help this platform be successful" (Cronbach's standardized alpha is 0.89).

Economic needs were measured with two one-item measures in which crowdworkers indicated on a five-point scale how important they find each of the two reasons to work on CW platforms: *lack of job alternatives* and *improving financial situation*. Socio-emotional needs were measured in a similar way, with two one-item scales: *interesting job tasks* and *passing the time*.

We chose to operationalize needs in a context-specific way because of the strong heterogeneity of crowdworkers. The particular measures were formulated based on arguments on the most important crowdworkers' motives in the literature (e.g. Archak, 2010; Brabham, 2008, 2010; Brawley & Pury, 2016; DiPalantino & Vojnovic, 2009; Horton & Chilton, 2010; Zhong et al., 2011).

Satisfaction with pay aspects was measured with an index summarizing crowdworkers' experience with the monetary aspect of TEXTPLAT's compensation system. Three items, each on a five-point scale, were included in an index: Crowdworkers agree that rewards for the platform's rating are appropriate; that higher ratings will lead to a substantial improvement of income from work on this platform; and that they are motivated by the platform's ratings.

Satisfaction with status aspects was measured in a similar way. Three items are included: Crowdworkers indicated their agreement with statements that higher ratings lead to a better choice of tasks; that their performance is being recognized by the platforms through the ratings; and that they receive recognition from other crowdworkers through the ratings.

Though the scales for satisfaction and needs are more specific than more generic scales used in the literature (e.g. Schörpf et al., 2017), they received plausible responses in all four platforms we surveyed. Hence, they appear to be so general that they can be applied in CW or the platform context more generally.

Hours per week, as an indicator for crowdworkers' participation (Deng & Joshi, 2016), is the average hours which the crowdworker reported to work per week on the platform TEXTPLAT.

Intention to stay, measured on a single five-point scale, is the crowdworker's intention of continuing work on TEXTPLAT within the next year.

Information about crowdworkers' personal circumstances are derived from four variables: the *employment status* in nine categories, namely employed, self-employed, employed in mini job, in vocational training/student, in professional development, in parental leave, retired, unemployed, and not gainfully employed; whether CW is the *main occupation*; *tenure*, which is measured by the number of months a crowdworker has been registered with the platform; and *crowdworkers' star rating* on the compensation system ranging. Only four rating levels were observed, namely 4, 4+, 4++, and 5 stars. Descriptive statistics and correlations for all variables are reported in Tables 1 and 2.

Table 1. Descriptive statistics and correlations of analyzed variables and indices

Variable	Obs.	Mean	s. d.	1	2	3	4	5	6	7	8	9	10
1 Calculative commitment	204	3.48	0.84	1.00									
2 Affective commitment	204	3.50	1.09	0.47	1.00								
3 Lack of alternatives	204	2.23	1.46	-0.13	0.17	1.00							
4 Improvement of financial situation	204	3.91	1.15	0.12	0.27	0.34	1.00						
5 Interesting tasks	204	3.74	1.08	0.46	0.10	-0.06	0.19	1.00					
6 Passing time	204	2.06	1.21	0.04	-0.27	-0.05	0.03	0.21	1.00				
7 Satisfaction with pay	204	3.11	1.14	0.48	0.19	-0.11	0.12	0.31	0.00	1.00			
8 Satisfaction with status	204	2.00	1.18	0.38	0.11	-0.09	-0.01	0.17	0.06	0.38	1.00		
9 Intention to stay	204	4.57	0.87	0.26	0.20	-0.02	0.01	0.15	-0.08	0.19	0.08	1.00	
10 Tenure (in months)	169	58.11	30.83	0.21	0.30	-0.10	-0.07	0.03	-0.15	0.23	0.16	0.12	1.00
11 Work hours per week	204	15.72	11.22	0.26	0.47	0.12	0.06	0.09	-0.26	0.19	0.17	0.03	0.15

Notes: Correlations of |0.1457| or higher are significant at $p \leq 0.05$

Table 2. Distribution of employment status, crowdworking as main occupation and crowdworker's star rating in the case of TEXTPLAT

Employment status (Multiple selection possible)	Freq. (n = 204)	Per.
Employed	40	20%
Self-employed	134	66%
Employed in mini job	17	8%
In vocational training/student	21	10%
In professional development	3	1%
On parental leave	17	8%
Retired	12	6%
Unemployed	7	3%
Not gainfully employed	9	4%
Crowdwork is main occupation	87	43%
Crowdworker's rating	**Freq.**	**Per.**
No value	25	12%
2 Stars	0	0%
3 Stars	0	0%
4 Stars	43	21%
4 Stars +	74	36%
4 Stars + +	41	20%
5 Stars	21	10%

The empirical analysis proceeded in various steps. We first conducted a fuzzy-set qualitative comparative analysis or fs/QCA (Ragin, 2000, 2009; Schneider & Wagemann, 2012). Hypothesis 1 posits that a limited number of need-satisfaction combinations exist which can account for high affective and high calculative commitment. It does not call for a statistical test

but the inductive exploration of a typology (for an example in a similar context, Meyer et al., 2012). The fs/QCA is a method highly suitable for such a task (Fiss, 2011). In particular, fs/QCA derives via Boolean logic and set theory how various conditions combine to a number of causal paths each of which sufficiently explains a particular outcome. We shed light on Hypothesis 1 by examining which need-satisfaction combinations are sufficient by computing two different fs/QCA, one for affective and one for calculative commitment as outcome variable. Though relatively new, fs/QCA has been used in similar contexts for example to explain multiple paths to commitment (López-Cabarcos, Vázquez-Rodríguez, & Piñeiro-Chousa, 2016) or trust in organizations (Frazier, Tupper, & Fainshmidt, 2016). It has also been suggested as an appropriate method to address particular questions in a person-centered approach (Gabriel et al., 2018). Subsequent to the fs/QCA, we compared the types of committed crowdworkers we found in terms of their tenure with the current platform, the star rating on TEXTPLAT, employment status, and whether they engage in CW as their main occupation. This descriptive analysis serves to enrich and increase the plausibility of our typology – if Hypothesis 1 is supported, the need-satisfaction combinations should reflect particular personal circumstances.

In a final step, we formally tested the Hypotheses 2a, 2b, 3a, and 3b by computing OLS regressions and partly combining them with the fs/QCA findings. Various combinations of the set-theoretic QCA and correlation-based regressions can be found in the literature (Meuer & Rupietta, 2017a, 2017b). We combined the two methods in a particular way following Fiss, Sharapov, and Cronqvist (2013): In the regressions, fuzzy-set values were used for the dependent and independent variables. This allowed us to formally test the configurational Hypotheses 2b and 3b, according to which the sufficient need-satisfactions combinations will be associated with intention to stay and participation. By inserting the set values for each causal path to a regression analysis, we are able to subject the configurational claim to a formal hypothesis testing, an exercise that cannot be achieved using fs/QCA alone (Fiss et al., 2013).

3.3 Calibration for fs/QCA

A fs/QCA analyzes set values, so raw data for outcomes and conditions need to be calibrated into values from 0 to 1. Table 3 summarizes how outcomes and conditions have been calibrated.

Table 3. Calibration of outcomes and conditions for the fuzzy-set qualitative comparative analysis

Name	Scaling of raw data	Calibration
Outcomes		
High calculative commitment	Mean of values on four items each on a scale from 1 to 5	Log-odds method with anchor points: 2.0, 3.0, 4.5
High affective commitment	Mean of values on nine items each on a scale from 1 to 5	Log-odds method with anchor points: 2.0, 3.0, 4.5
Conditions		
Strongly motivated by lack of job alternatives	Each variable on a single point scale from 1 to 5	For each variable: (1): 0.00; (2): 0.25; (3): 0.50; (4): 0.75 (5): 1.00
Strongly motivated by improving financial situation		
Strongly motivated by interesting tasks		
Strongly motivated by passing time		
High satisfaction with pay aspects	Three single items on a scale from 1 to 5	Each variable calibrated: (1): 0.00; (2): 0.25; (3): 0.50; (4): 0.75 (5): 1.00 Minimum of set values used as condition
High satisfaction with status aspects	Three single items on a scale from 1 to 5	Each variable calibrated: (1): 0.00; (2): 0.25; (3): 0.50; (4): 0.75 (5): 1.00 Minimum of set values used as condition

High affective and high calculative commitment are mean values defined from 1 to 5. For the 0.5 crossover point we chose a raw value 3 because the item underlying that value is formulated in a neutral way, which is equivalent to the idea of the crossover point being neither in nor out of the set. To ensure that no observations will be lost for the minimization procedure, we followed usual practice and subtracted 0.001 from all fuzzy-set values of 0.5 (Rubinson, Gerrits, Rutten, & Greckhamer, 2019). In other words, all cases with a raw value of 3 were treated as being slightly out of the set.

The four conditions measuring crowdworkers' needs or their motives to do CW are each defined on a five-point scale. Again, we selected for the 0.5 cross-over point the neutral value of 3. Proportionate fuzzy values for the raw values of 1, 2, 4 and 5 were chosen. High satisfaction with pay aspects was measured with three single items on a five-point scale. Each item was calibrated in the same way as the crowdworkers' needs conditions. Rather than averaging the items, we chose a procedure in line with Boolean logic by taking the minimum of the three items' set values. The resulting condition is the subset of the three items and indicates the degree to which a crowdworker is highly satisfied with all three pay aspects measured, namely that

rewards for the platform's rating are appropriate, that higher ratings will lead to a substantial improvement of income, and that crowdworkers feel motivated by the platform's ratings. High satisfaction with status aspects of the platform was calibrated likewise. We found this procedure more appropriate than averaging. The needs and the satisfaction items refer to differing dimensions; in terms of measurement theory, they are formative rather than reflective constructs (Coltman, Devinney, Midgley, & Venaik, 2008). More generally, taking the mean to aggregate variables is only one of various possibilities in the social sciences. Taking the minimum of fuzzy-set values, as we do, is equivalent to testing the "weakest link" between the two conditions and the outcome we measure (Goertz, 2020: 15-16). By aggregating in this way, we include a configurational logic into the construction of the conditions, which is consistent with the QCA approach.

Using the set values of six conditions, we examined the 204 crowdworkers ("cases") in a sufficiency analysis in fs/QCA. This proportion of conditions to cases strike a balance that meets important guidelines suggested in the literature. Given the number of cases, the number of conditions is low enough to exclude that the findings may come about purely by chance (Marx, 2010), and it is high enough to exclude that sufficient combinations of conditions are based on very few unusual cases (Schulze-Bentrop, 2013).

In the fs/QCA procedure, a truth table analysis helps to identify those ideal types – combinations of all conditions – that are sufficiently linked to the outcome. Then the Boolean expressions for the solution can be reduced through a logical minimization procedure. There is some discussion on which type of solution in fs/QCA to choose (for example, Baumgartner, 2015; Schneider, 2018). We report the most parsimonious solution. It uncovers solutions that only include core conditions (those that will form part of the solution in other minimization options, see Fiss 2011) and stand for larger groups of crowdworkers. Reverting from ideal types to the real observations, coverage and consistency measures can be consulted to specify the models (Ragin, 2009; Schneider & Wagemann, 2012). In particular, we chose consistency cut-offs at 0.9 and 0.8 for affective and calculative commitment respectively. They differ for reasons given below. In addition, we consulted the PRI (Proportional Reduction of Inconsistency) consistency score, which indicates whether a particular combination of conditions sufficiently explains both the outcome and its negation. Neither the PRI consistency scores nor an analysis of fs/QCA models with the negated outcome indicated any such problem of skewed data (for details, Schneider & Wagemann, 2012: 232-249). Finally, we conducted an analysis of necessity. None of the conditions or their negation was found to be a necessary condition for any of the two outcomes.

4 Results

4.1 Several need-satisfaction combinations (Hypothesis 1)

Including as we do six conditions implies that 64 ideal typical combinations are possible. Of these, 34 of high affective commitment are actually observed in the data, as the truth table shows (Table 4). A sufficiency analysis requires a consistency threshold of at least 0.75 (Ragin, 2009: 136) but substantial gaps in the consistency scores between two truth table rows are frequently applied to set an appropriate threshold (Schulze-Bentrop, 2013). For high affective commitment, a consistency threshold of 0.90 was applied because of a substantial drop in the consistency level to the next row in the truth table. This implies that 24 combinations of conditions enter the minimization process.

Table 4. Truth table of the observed ideal typical combinations of six conditions for affective commitment as outcome

	Motivated by interesting task	Motivated by passing time	Satisfied with status aspects	Motivated by lack of job alternatives	Motivated by additional income	Satisfied with pay aspects	Number	Consistency
1	0	1	1	0	1	0	1	0.996
2	1	1	1	0	0	1	1	0.992
3	1	0	1	0	0	1	2	0.989
4	1	1	1	0	1	1	3	0.988
5	0	0	1	0	0	0	2	0.987
6	0	0	1	0	1	0	1	0.984
7	1	1	1	1	1	1	1	0.979
8	1	0	1	0	0	0	1	0.972
9	0	1	0	0	0	0	1	0.968
10	1	0	1	1	1	0	1	0.967
11	1	0	1	0	1	1	7	0.963
12	0	0	1	0	0	1	2	0.962
13	1	0	1	1	1	1	1	0.958
14	1	0	0	0	0	1	7	0.951
15	1	1	0	0	1	1	8	0.949
16	0	1	0	0	1	1	1	0.946
17	1	1	0	0	0	1	1	0.936
18	1	1	0	0	1	0	9	0.930
19	1	0	0	0	1	1	20	0.916
20	1	1	0	0	0	0	4	0.914
21	0	0	0	0	1	1	9	0.910
22	1	0	0	1	1	1	7	0.909
23	0	0	0	0	0	1	3	0.904
24	1	0	0	0	0	0	15	0.900

Table 4. Continued

	Motivated by interesting task	Motivated by passing time	Satisfied with status aspects	Motivated by lack of job alternatives	Motivated by additional income	Satisfied with pay aspects	Number	Con-sistency
25	1	0	0	1	0	0	1	0.898
26	0	1	0	0	1	0	4	0.887
27	1	0	0	0	1	0	26	0.886
28	1	1	0	1	1	1	2	0.885
29	0	0	0	1	1	1	1	0.875
30	0	0	0	1	0	0	4	0.870
31	0	0	0	0	0	0	14	0.861
32	0	0	0	0	1	0	16	0.847
33	1	0	0	1	1	0	13	0.806
34	0	0	0	1	1	0	15	0.744

The solutions for the two fs/QCA are reported in Table 5. Five solutions or paths evolve from the analysis for *affective* commitment. Among these, Path (5) only covers 3 crowdworkers and will therefore not be interpreted. Path (1) covers 23 crowdworkers who are highly motivated by interesting tasks and who are at the same time not highly motivated by a lack of job alternatives and by additional income. Path (2) covers 43 crowdworkers who are highly motivated by interesting tasks, not highly motivated by passing the time and who are at the same time highly satisfied with the pay aspects of the compensation system. Path (3) covers 58 crowdworkers who are not motivated by a lack of job alternatives and are highly satisfied with the pay aspects. Finally, Path (4) covers 22 crowdworkers who are highly satisfied with the status aspects of the compensation system.

Table 5. Mechanisms linked to affective and calculative commitment (sufficiency analysis of fs/QCA, most parsimonious solution)

	Outcome							
	Affective commitment					Calculative commitment		
Conditions	1	2	3	4	5	6	7	8
Motivated by lack of job alternatives	⊗		⊗				●	
Motivated by additional income	⊗				⊗	●		
Satisfied with pay aspects		●	●					
Motivated by passing time		⊗			●	⊗		
Motivated by interesting task	●	●					●	
Satisfied with status aspects				●				●
Ideal type cases	31	44	64	23	7	117	26	23
Consistent cases	23	43	58	22	3	90	20	18
Real contradictions	8	1	6	1	4	27	6	5
Consistency	0.883	0.920	0.892	0.938	0.872	0.786	0.821	0.816
Raw coverage	0.294	0.570	0.581	0.360	0.150	0.706	0.310	0.320
Unique coverage	0.026	0.059	0.061	0.029	0.000	0.297	0.027	0.054

Overall solution consistency	0.870					Overall solution consistency		0.771
Overall solution coverage	0.751					Overall solution coverage		0.799
Consistency cut-off	0.900					Consistency cut-off		0.800
(lowest PRI score)	(0.690)					(lowest PRI score)		(0.630)

Notes: ● condition is present; ⊗ condition is absent. Consistent cases: number of crowdworkers for which fuzzy-set values of both the solution path and the outcome is above 0.5. Real contradictions: number of crowdworkers for which fuzzy-set value of the solution path is above 0.5 but that for the outcome is below 0.5. Calculations with the "fuzzy" command in Stata 15 (Longest and Vaisey 2008), additional calculations with fs/QCA 3.0 (Ragin & Davey, 2016).

For high calculative commitment (Table 6), a consistency threshold of 0.80 was applied, again based on a substantial drop in consistency between subsequent next truth table rows. Apparently, the conditions do not explain calculative as neatly as they explain affective commitment; the data show a higher degree of contradictions. Nonetheless, the consistency threshold exceeds the minimum of 0.75, and the resulting consistencies for the overall terms are up to levels in similar studies in management (for a summary, Schulze-Bentrop, 2013). As a result of the consistency threshold, 22 ideal type cases are considered sufficient for the outcome.

Table 6. Truth table of the observed ideal typical combinations of six conditions for calculative commitment as outcome

	Motivated by interesting task	Motivated by passing time	Satisfied with status aspects	Motivated by lack of job alternatives	Motivated by additional income	Satisfied with pay aspects	Number	Con-sistency
1	1	0	1	1	1	0	1	0.936
2	1	0	1	1	1	1	1	0.916
3	1	1	1	1	1	1	1	0.882
4	0	0	0	1	1	1	1	0.879
5	1	0	0	1	1	1	7	0.870
6	0	0	1	0	1	0	1	0.867
7	0	0	1	0	0	0	2	0.866
8	1	1	1	0	1	1	3	0.865
9	0	0	1	0	0	1	2	0.855
10	1	0	1	0	1	1	7	0.853
11	1	0	0	1	1	0	13	0.851
12	0	1	1	0	1	0	1	0.846
13	1	0	0	0	1	1	20	0.839
14	0	0	0	0	1	1	9	0.832
15	1	0	1	0	0	0	1	0.831
16	1	1	0	1	1	1	2	0.829
17	0	0	0	1	1	0	15	0.828
18	1	0	0	0	1	0	26	0.825
19	1	0	1	0	0	1	2	0.821
20	1	1	1	0	0	1	1	0.814
21	1	0	0	1	0	0	1	0.809
22	0	0	0	0	1	0	16	0.807
23	0	0	0	0	0	1	3	0.796
24	0	0	0	1	0	0	4	0.794
25	1	1	0	0	1	1	8	0.793
26	1	0	0	0	0	1	7	0.785
27	1	1	0	0	1	0	9	0.784
28	0	0	0	0	0	0	14	0.770
29	1	0	0	0	0	0	15	0.768
30	0	1	0	0	1	1	1	0.767
31	0	1	0	0	1	0	4	0.725
32	1	1	0	0	0	1	1	0.711
33	0	1	0	0	0	0	1	0.703
34	1	1	0	0	0	0	4	0.634

As Table 5 shows, three solutions or paths evolve from the analysis for *calculative* commitment. Path (6) consists of crowdworkers who are highly motivated by additional income and not highly motivated by passing the time. It is the most important path sufficiently explaining high calculative commitment among 90 crowdworkers. Path (7) covers 20 crowdworkers who are highly motivated by a lack of job alternatives and by interesting tasks. Path (8) covers 18

crowdworkers who are highly satisfied with status aspects of the compensation system. Interestingly, Path (8) is identical with path (4). Hence, being satisfied with status is sufficiently linked to both high affective and high calculative commitment.

Overall, the fs/QCA lends support to Hypothesis 1. We are able to identify six need-satisfaction combinations that are sufficiently linked to high affective commitment or to high calculative commitment. One combination is sufficiently linked to high commitment of both types. Some of these combinations include satisfaction with pay or status, others only include particular needs. Some paths involve purely social or purely economic exchange mechanisms; others mix the two logics. Hence crowdworkers are diverse but their diversity can be expressed in a limited number of need-satisfaction combinations – causal paths or mechanisms – that underlie either component of strong commitment.

4.2   Six groups of committed crowdworkers

It is likely that the groups represented by the differing causal paths differ in terms of personal characteristics such as their employment status. It is also likely that they differ in terms of other factors related to commitment such as tenure (months registered with the platform) and their rating in the platform's compensation system. We therefore compared the various groups of committed crowdworkers, as suggested by the fs/QCA, in terms of additional variables (see Table 1 and Table 2 for descriptive statistics). This comparison helps us to enrich the typology of combinations with personal circumstances and probes into the plausibility of the fs/QCA findings. Table 7 compares the means in the selected variables between all crowdworkers who are described by each of the six causal paths. The pattern lends more weight to our typology of six groups of committed crowdworkers because each group includes a large number of persons with similar circumstances, circumstances that trigger the mechanism we have identified with our needs-satisfaction combinations.

Table 7. Comparing background characteristics and other measures of engagement among six groups of committed crowdworkers

Causal path:	1	2	3	4 & 8	6	7
	Intrinsically motivated side-jobbers	*Task-oriented, long-term crowd-workers*	*Pay-oriented, long-term side-jobbers*	*Status-oriented, long-term side-jobbers*	*Rank-and-file crowd-workers*	*Precarious crowd-workers*
Tenure (in months)						
Registered with the platform	58.26	69.26	70.50	71.78	54.66	54.00
Crowdworker's rating (in %)						
4 Stars	0.11	0.14	0.20	0.29	0.25	0.29
4 Stars +	0.46	0.26	0.26	0.33	0.40	0.48
4 Stars ++	0.18	0.26	0.31	0.19	0.23	0.05
5 Stars	0.25	0.33	0.23	0.19	0.12	0.19
Main occupation (in %)						
Crowdwork	0.38	0.60	0.41	0.35	0.53	0.88
Employment status (in %; multiple answers possible)						
Employed	0.16	0.07	0.20	0.13	0.16	0.08
Self-employed	0.77	0.73	0.67	0.61	0.69	0.62
Employed in mini job	0.10	0.07	0.06	0.04	0.11	0.04
Unemployed	0.00	0.05	0.03	0.09	0.05	0.12
In vocational training/student	0.00	0.09	0.05	0.09	0.15	0.15
In professional development	0.00	0.00	0.00	0.00	0.02	0.00
Not gainfully employed	0.00	0.05	0.03	0.00	0.03	0.15
On parental leave	0.03	0.14	0.11	0.09	0.10	0.08
Retired	0.00	0.02	0.06	0.17	0.03	0.00

According to the fs/QCA, *intrinsically motivated side-jobbers* (Path 1, n=31) are highly motivated by interesting tasks – and not motivated by a lack of job alternatives and additional income, and this is sufficiently linked to high affective commitment. This groups includes 16 percent employed persons and 77 percent self-employed. Only 38 percent are full-time crowdworkers suggesting that this group includes many who engage in text creation at TEXTPLAT as a complement to their main occupation outside of CW.

Task-oriented, long-term crowdworkers (Path 2, n=44) are highly motivated by interesting tasks but not by passing the time, and they are highly satisfied with pay. According to the fs/QCA, this combination is sufficiently linked to high affective commitment. This group includes fewer employed (7 percent), but more self-employed persons (73 percent) and persons on parental leave (14 percent). They had been registered with the platform for 69 months on average. With a slight majority of 60 percent, persons in this groups say that CW is their main occupation.

This group includes many highly rated crowdworkers: 59 percent are rated 4++ or 5, the two highest ratings, compared to 28 percent for other crowdworkers. In sum, this group represents crowdworkers with long tenure and strong expertise reflected in a high rating level, and more than other groups they are motivated by interesting tasks.

Pay-oriented long-term side-jobbers (Path 3, n=64) are highly satisfied with pay and not highly motivated by a lack of job alternatives, and this is sufficiently linked to high affective commitment. Most crowdworkers in this group are employed, self-employed or on parental leave. Their tenure with the platform is disproportionally high with 71 months on average, compared with 52 months for other crowdworkers. Though their rating level varies, most crowdworkers (54 percent) are rated 4++ or 5, compared to 25 percent among other crowdworkers. Overall, this group resembles the task-oriented long-term crowdworkers in terms of tenure and expertise but are more often in side-jobs than other groups.

Status-oriented long-term side-jobbers (Paths 4 & 8, n=23) are characterized by their satisfaction with status aspects of a platform's compensation system, which is sufficiently linked both to high affective and high calculative commitment. This group includes a larger share of employed persons, persons on parental leave and retired people of which only 35 percent report CW to be their main occupation. Hence, they are mostly side-jobbers. Nevertheless, their intention to stay registered on a platform shows in their tenure: They have been registered with the platform for 72 months on average, compared to 56 months for all other crowdworkers. Despite high tenure and high satisfaction with the status aspect of the compensation system, most crowdworkers in this group are at the 4+ stars level only, supporting the side-jobbers label.

Rank-and-file crowdworkers (Path 6, n=117) are highly motivated by additional income and not highly motivated by passing the time, and this is sufficiently linked to their high calculative commitment to TEXTPLAT. As Table 7 shows, the employment status differs broadly within this group, because it includes disproportionately more self-employed persons, regular employees, employees in mini-jobs and students. The proportion of self-employed still is the most dominant, as in the other groups. Despite varying backgrounds, 53 percent in this group report CW to be their main occupation and report a tenure of 55 months on average, which is the second lowest of the six groups. In sum, rank-and-file crowdworkers are persons with various occupational backgrounds primarily motivated by additional income. This is also consistent with their lower tenure – given their motivation, it seems more likely that they would

leave a platform for better paid work. Path (6) covers the largest group of committed crowdworkers.

Precarious crowdworkers (Path 7, n=26) are highly motivated by a lack of job alternatives and interesting tasks, and this is sufficiently linked to high calculative commitment. This group includes disproportionally more persons with precarious employment status: a large group of unemployed, non-working or self-employed persons, fewer employed persons – and 88 percent with CW as their main occupation, compared to 38 percent among other crowdworkers. Moreover, it includes a larger share of crowdworkers with lower ratings. Among them, 77 percent are rated 4 or 4+, compared to 64 percent among the other crowdworkers. As a result, this group earns lower incomes for a given amount of work. The combination of lack of job alternatives and lower incomes because of a lower rating level indicates a precarious situation, especially for unemployed or non-working people.

4.3   Links to work hours and intention to stay (Hypotheses 2a, 2b, 3a and 3b)

The findings of OLS regressions show associations between the two components of commitment with weekly work hours and the intention to stay that support Hypotheses 2a and 3a. Table 8 summarizes the key findings of the regressions, in which participation and intention to stay are regressed on the fuzzy-set values of high affective and of high calculative commitment.

In line with Hypothesis 2a, the fuzzy-set value of high affective commitment is strongly related to the intention to stay with the platform for at least another year ($p < 0.01$). As an illustration of the effect size, one can compare crowdworkers at opposite ends of the high commitment spectrum. A crowdworker with a fuzzy-set value of high affective commitment at 1 is estimated to report an intention to stay that is 0.579 points higher on the five-point scale than a crowdworker with a fuzzy-set value of high affective commitment at 0.

In line with Hypothesis 3a, the fuzzy-set value of calculative commitment is strongly related to hours worked per week, which measures participation on the platform ($p < 0.01$). A crowdworker with a fuzzy-set value of high calculative commitment of 1 is estimated to put in about 14.06 more hours per week than a crowdworker with a fuzzy-set value of high calculative commitment at 0.

Table 8. Regression findings of participation and intention to stay regressed on the fuzzy set values of high affective commitment and high calculative commitment

Independent variables	Dependent variables	
	Hours per week (participation)	Intention to stay
Calculative commitment	14.06***	0.233
	(2.295)	(0.191)
Affective commitment	0.761	0.579***
	(2.674)	(0.222)
Constant	6.233***	4.041***
	(1.851)	(0.154)
Observations	204	204
F-value	24.43***	6.93***
R-squared	0.196	0.064

*Notes: Standard errors in parentheses; significance levels: *** p<0.01, ** p<0.05, * p<0.1; calculations with Stata 15.*

In Hypotheses 2b and 3b, it was speculated that the need-satisfaction combinations which are sufficiently linked to high affective and to high calculative commitment will also show some statistical links with work hours and the intention to stay. Table 9 reports findings of OLS regressions in which the fuzzy-set values of the respective need-satisfaction combinations are included as explanatory variables, a procedure following Fiss et al. (2013).

Overall, the levels of statistical significance are much lower than expected, both for single variables and the complete regression models. Although most of the results therefore clearly contradict Hypotheses 2b and 3b, two interesting findings evolve.

First, the fuzzy-set value of *status-oriented long-term side-jobbers* is associated with more work hours per week ($p < 0.1$). While only weakly statistically significant, this effect is of considerable size. Compared to a crowdworker with a fuzzy-set value of 0 in the explanatory variable, a crowdworker with a value of 1 will work an estimated 5.406 hours more per week. This is in line with Hypothesis 3b. Interestingly, this group of crowdworkers was found to be associated with both components of high commitment. Hence, according to Hypothesis 2b, the fuzzy-set value of *status-oriented long-term side-jobbers* should also be associated with a higher intention to stay. But this does not show in the findings. The regression coefficient is close to 0 and statistically insignificant.

Second, the fuzzy-set value of *task-oriented long-term crowdworkers* is associated with higher intention to stay ($p < 0.1$). Though weakly statistically significant, the effect is of considerable size with a 0.678 points difference between the fuzzy-set values of 1 and 0. This is in line with Hypothesis 2b. However, the fuzzy-set value of *task-oriented long-term crowdworkers* is also associated with more hours per week, a link we did not expect because being a *task-oriented long-term crowdworker* was not found to explain high affective commitment sufficiently in the

fs/QCA. Still the effects size is large, with an estimated 8.394 hours per week difference between the fuzzy-set values of 1 and 0.

Overall, the findings in Table 9 imply that the average links between high commitment on the one hand and participation and intention to stay on the other differ markedly depending on the mechanisms that underlie the high commitment.

Table 9. Regression findings of participation and intention to stay regressed on the fuzzy-set values of the six mechanisms

Independent variables	Dependent variables	
	Hours per week (participation)	Intention to stay
Mechanisms related to high affective commitment:		
Intrinsically motivated side-jobbers (Path 1)	-3.680	-0.384
	(4.237)	(0.334)
Task-oriented long-term crowdworkers (Path 2)	8.394*	0.678*
	(4.532)	(0.357)
Pay-oriented long-term side jobbers (Path 3)	-3.015	0.0233
	(3.982)	(0.314)
Mechanism related to both components of high commitment:		
Status-oriented long-term side-jobbers (Paths 4 & 8)	5.406*	0.0704
	(2.804)	(0.221)
Mechanisms related to high calculative commitment:		
Rank-and-file crowdworkers (Path 6)	2.030	-0.209
	(3.519)	(0.277)
Precarious crowdworkers (Path 7)	0.655	-0.133
	(3.426)	(0.270)
Constant	11.72***	4.502***
	(3.131)	(0.247)
Observations	204	204
F-value	2.91***	1.40
R-squared	0.081	0.041

Notes: Standard errors in parentheses; significance levels: *** p<0.01, ** p<0.05, * p<0.1; calculations with Stata 15.

5 Discussion

5.1 Contribution

We have identified six groups of crowdworkers who are committed to a platform that brokers text creation tasks and operates a sophisticated RBCS. The different groups are committed for different reasons, in terms of needs and satisfaction with the platform's compensation system, and in different ways, either affectively or in a calculative way. We have also demonstrated that

each component of commitment is associated with one important dimension of performance. Calculative commitment is related to work hours per week on the platform (participation), and affective commitment is related to the intention to stay with the platform for another year. In sum, this paper has unpacked how particular routes to long-term commitment evolve in platforms with complex tasks and an incentive hierarchy, and how commitment matters for performance.

The paper contributes to the diverse literature on incentives and commitment in the crowdsourcing context in three important ways. First, our results extend work that examines why people are committed to CW. Among the single reasons which were identified before are perceived fairness in contests (Faullant & Dolfus, 2017; Franke, Keinz, & Klausberger, 2013), pride and respect during communications on platforms (Boons et al., 2015), satisfaction with the process, and a sense of virtual community (Schulten & Schaefer, 2015). Our findings confirm that such factors are important because the whole range of conditions referring to motivation and satisfaction appeared in the causal paths to commitment we have uncovered. But diverging from the linear-additive thinking followed in previous work, we have followed a configurational approach. Applying fs/QCA, we found a number of distinct needs-satisfaction combinations to be sufficiently related to commitment. This result is more fine-grained and qualified than the broad generalizations that may come from a linear approach. For example, Zheng et al. (2011) found intrinsic motivations to be twice as important as extrinsic motivation for persons to participate in paid innovation crowdsourcing. In our findings, intrinsic motivation – measured by "interesting tasks" and "passing the time" – matters for the commitment of some groups, but only in combination with some other factor. Causal Path 7, for example, describes crowdworkers who are motivated by interesting tasks and by a lack of job alternatives. By detailing different reasons to engage in CW in this way, the configurational approach is particularly instructive to better understand the reasons for commitment and long-term engagement, an important advantage given our limited knowledge of who, among a heterogeneous crowd, will be committed to a platform.

Second, our paper shows that the work on "incentive hierarchies" in crowdsourcing is highly relevant to CW. Previous work on reputation systems focused on "glory" in unpaid crowdsourcing (Goes et al., 2016). Such incentives, which are based on publicly visible hierarchical star ratings, clearly matter for CW, but monetary incentives also do. Conversely, there are some studies that demonstrate how monetary incentives may affect crowdworker performance (e.g. Mason & Watts, 2009; Peer et al., 2014) but these studies ignore the important non-monetary aspects of incentive hierarchies such as recognition and gamification.

We suggest that the ingenious way in which RBCSs combine monetary and non-monetary incentives need to be taken into account in order to understand the selection of individual crowdworkers and the success of entire CW platforms. The range and interplay of incentives attract persons in varying circumstances and with different motives. This in turn affects performance in ways that, again, are itemized and group-specific. For example, Ye and Kankanhalli (2017) found that on average monetary incentives and enjoyment are each associated with participation in crowdsourcing. By contrast, we found highly group-specific, configurational patterns. For example, the rank-and-file crowdworkers (Path 6), who are motivated by additional income but not by enjoyment ("passing the time"), put in only slightly more hours than the average crowdworker and much less than task-oriented long-term crowdworkers in Path 2.

Finally, our paper illustrates that two components of commitment can help us understand long-term work relationships in CW. It is surprising that previous work has not measured the well-established commitment construct; the widespread incentive hierarchies (Goes et al., 2016; Liu et al., 2016b) are designed to retain users on the platform. This retention effect is even strong on the RBCSs for paid crowdwork we study because these also offer considerable material incentives to participate on a long-term basis. Unlike Schulten and Schaefer (2015), we have therefore theorized and measured two components of commitment. The findings have confirmed this decision – each of the two components of commitment was related to a different dimension of performance, and each depended on distinct needs-satisfaction combinations. Overall, we have demonstrated how the commitment concept introduced by Meyer and Allen (1991) can readily be adapted to a new focus, the CW platform. Interestingly, not all insights from the literature on crowdworker commitment to employers travel well to CW platforms. A pretest revealed that crowdworkers to not develop normative commitment to a platform. We have decided to omit this component of the original model. Furthermore, links to performance differ from those in paid regular employment. In the original model, it was speculated that affective commitment rather than calculative commitment will be related job performance (Meyer & Allen, 1991). If we take hours of work on the platform (participation) as a measure of performance, we expected and found the opposite – calculative commitment not affective commitment was associated with participation.

5.2   Managerial and public policy implications

As a first managerial implication, the platform should invest in an attractive RBCS: in a good choice of tasks, more recognition and better pay when crowdworkers are promoted to higher

levels. Among the conditions we examined, the needs measures can be interpreted as reasons to engage in CW more generally – but satisfaction with status or pay aspects of the compensation system are reasons to be committed to the particular platform. Half the mechanisms we found, namely Paths 2, 3 and 4/8, include satisfaction with pay aspects or with status aspects of the compensation system as part of the solution. In other words, satisfaction with some aspect of the compensation system makes a crucial difference for whether a crowdworker is committed or not.

Second, managers should foster in their rating system status and pay aspects alike; they should seek to combine monetary with non-monetary incentives. This is because motivations vary widely ranging from the intrinsically motivated side-jobbers (Path 1) to the precarious crowdworkers who are motivated by additional income (Path 7). In general, commitment hinges on satisfaction with pay aspects for some groups, and on satisfaction with status aspects for others.

Third, managers can apply the fs/QCA to identify groups of key workers within the crowd and to predict their patterns of behavior and performance. The personas concept is a popular method to illustrate different types of user groups (Moser et al., 2012) but personas are "explicitly fictional individuals" (Chapman & Milham, 2006: 634). By contrast, a fs/QCA identifies groups of actual individuals based on real data. This analysis yielded information of practical importance. For example, platform management should be particularly interested in the task-oriented long-term crowdworkers (Path 2 n=44). Members of this group are not only affectively committed to the platform, they are also distinctive of the strongest intention to stay and the highest level of participation. They form a group of experts which are of particular value to the platform. Though these particular results are specific, the configurational approach as method is instructive for other platforms too, who all need to understand the heterogeneous crowd of (potential) crowdworkers.

Our results are also related to the public policy debate on CW. Microtask platforms have evoked the widespread belief that CW means badly paid short-term gigs but our study points to the existence of platforms with complex tasks and better paid tasks. The RBCS warrants long-term engagement, thus producing higher levels of pay for a large group of expert crowdworkers. On TEXTPLA, for example, notional hourly wages of about €9.54 are earned on average (at 4.38 work weeks per month and a standard deviation of €7.38), regardless of whether the crowdworker works full-time or only part-time on the platform. A significant increase of that hourly wage can be achieved in particular through a higher rating and a full-time engagement

on the platform. As our findings illustrate, only a minority of crowdworkers are in a precarious situation. These are mostly included in Path 7, the precarious crowdworkers who are committed in a calculative way and who are often unemployed. The remaining groups, however, consist of side-jobbers or self-dependent professionals in non-precarious situations who draw additional income and interesting writing tasks from their engagement on the platform.

Furthermore, a lock-in effect does not appear to be particularly important among the crowdworkers in our study. It has been argued that crowdworkers will become overly committed to a particular platform because they cannot credibly transfer their rating or reputation to other platforms (Schörpf et al., 2017). The lock-in effect is actually one of the ways which RBCSs build an interest among crowdworkers to stay on. However, the findings do not support the idea of a widespread lock-in because we do not find that calculative commitment is associated with a higher intention to stay.

5.3   Limitations and future research

The questionnaire was organized as a task on the platform which crowdworkers could decide to take on and for which they received a compensation. This is a convenient way of collecting data and has been used frequently (e.g. Bertschek et al., 2015; Brabham, 2010; Leimeister et al., 2009). However, the procedure implies that the sample is not random. We are likely to have a sample of people who are among the more committed and engaged crowdworkers. In light of our research question, this "bias" is not problematic. On the one hand, the goal was to identify particularly committed crowdworkers in the first place. One the other hand, though we have used a presumably homogeneous sample of more committed crowdworkers we still found clear-cut differences between groups of crowdworkers. If anything, the links between commitment on one hand, and participation and intention to stay on the other, should be more pronounced in more representative samples. Nonetheless, future studies should explore this and try to elicit more complete and random samples.

We have focused on a single platform to hold important aspects of the context constant, including the type of task and the compensation system. But as a downside, the findings cannot be generalized in an unreflective way. Similar patterns are likely to be found only in platforms, which mediate tasks with higher skill needs and who operate a similar compensation system. It is also likely that the task of writing text in German limits global competition, thus allowing the platform to pay relatively generous compensation levels. Under such conditions, commitment is more likely to evolve. On platforms for microtasks and tasks that are open to global

competition, the resulting lower pay levels will inhibit commitment among large groups of the workforce in more affluent economies such as Germany.

As our study was cross-sectional and based on one platform only, we have not been able to establish a causal link between the compensation system and commitment. An important next step, therefore, is a systematic evaluation of the RBCS as a commitment device. It should be based on samples of crowdworkers from multiple platforms both with and without such a compensation system, allowing for a quasi-experimental design. Similarly, the cross-sectional nature of the survey forbids causal inferences. Another route for future studies is longitudinal analyses, for example a field experiment that examines how the introduction of a compensation system changes commitment, participation, and intention to stay.

6   Conclusions

The committed crowdworker is not a contradiction in terms. On platforms with complex tasks, we are likely to find several groups of crowdworkers who are interested in staying engaged with the platform. Though the term "crowd" suggests a large, amorphous group of people, crowdworkers do not have to remain elusive characters. This is because the reasons for commitment can be reduced to a varied but limited number of need-satisfaction combinations, as we have demonstrated applying fuzzy-set Qualitative Comparative Analysis (fs/QCA). Identifying such combinations is important because commitment is associated with important dimensions of performance. In particular, crowdworkers who are committed in a calculative way tend to put in more work hours (participation); and crowdworkers who are committed in an affective way intend to stay with the platform on a long-term basis. Overall, the approach and the findings of this paper can inform future research on RBCSs, which are systematically designed to attract and retain motivated crowdworkers.

7 References

Acar, O. A. 2018. Harnessing the creative potential of consumers: money, participation, and creativity in idea crowdsourcing. *Marketing Letters*, 29(2): 177–188.

Archak, N. 2010. Money, Glory and Cheap Talk: Analyzing Strategic Behavior of Contestants in Simultaneous Crowdsourcing Contests on TopCoder.com. *Proceedings of the 19th International Conference on World Wide Web*, 1: 21–30.

Auriol, E., & Renault, R. 2001. Incentive Hierarchies. *Annales d'Économie et de Statistique*, No.(63/64): 261–282.

Basili, M., & Rossi, M. A. 2020. Platform-mediated reputation systems in the sharing economy and incentives to provide service quality: The case of ridesharing services. *Electronic Commerce Research and Applications*, 39: 100835.

Baumgartner, M. 2015. Parsimony and Causality. *Quality & Quantity*, 49(2): 839–856.

Bayus, B. L. 2010. Crowdsourcing and individual creativity over time: The detrimental effects of past success. *Available at SSRN: https://ssrn.com/abstract=1667101*: 1–34.

Becker, H. S. 1960. Notes on the Concept of Commitment. *American Journal of Sociology*, 66(1): 32–40.

Bertschek, I., Ohnemus, J., & Viete, S. 2015. *Befragung zum sozioökonomischen Hintergrund und zu den Motiven von Crowdworkern an das Bundesministerium für Arbeit und Soziales, Berlin: Endbericht zur Kurzexpertise.* ZEW-Gutachten und Forschungsberichte.

Blau, P. M. 1986. Exchange and power in social life (2nd printing). New Brunswick: NJ: Transaction Books.

Boons, M., Stam, D., & Barkema, H. G. 2015. Feelings of Pride and Respect as Drivers of Ongoing Member Activity on Crowdsourcing Platforms. *Journal of Management Studies*, 52(6): 717–741.

Boudreau, K. J., Lacetera, N., & Lakhani, K. R. 2011. Incentives and Problem Uncertainty in Innovation Contests: An Empirical Analysis. *Management Science*, 57(5): 843–863.

Brabham, D. C. 2008. Crowdsourcing as a Model for Problem Solving: An Introduction and Cases. *Convergence*, 14(1): 75–90.

Brabham, D. C. 2010. Moving the crowd at Threadless: Motivations for participation in a crowdsourcing application. *Information, Communication & Society*, 13(8): 1122–1145.

Brawley, A. M., & Pury, C. L. S. 2016. Work experiences on MTurk: Job satisfaction, turnover, and information sharing. *Computers in Human Behavior*, 54: 531–546.

Casalo, L. V., Flavián, C., & Guinalíu, M. 2007. The Influence of Satisfaction, Perceived Reputation and Trust on a Consumer's Commitment to a Website. *Journal of Marketing Communications*, 13(1): 1–17.

Chapman, C. N., & Milham, R. P. (Eds.) 2006. *The personas' new clothes: methodological and practical arguments against a popular method:* SAGE Publications Sage CA: Los Angeles, CA.

Chittilappilly, A. I., Chen, L., & Amer-Yahia, S. 2016. A Survey of General-Purpose Crowdsourcing Techniques. *IEEE Transactions on Knowledge and Data Engineering*, 28(9): 2246–2266.

Coltman, T., et al. 2008. Formative versus reflective measurement models: Two applications of formative measurement. *Journal of Business Research*, 61(12): 1250–1262.

Deng, X. N., & Joshi, K. D. 2016. Why Individuals Participate in Micro-task Crowdsourcing Work Environment: Revealing Crowdworkers' Perceptions. *Journal of the Association for Information Systems*, 17(10): 711–736.

DiPalantino, D., & Vojnovic, M. 2009. Crowdsourcing and All-Pay Auctions, *Proceedings of the 10th ACM conference on Electronic commerce*: 119–128.

Durward, D., Blohm, I., & Leimeister, J. M. 2016. Crowd Work. *Business & Information Systems Engineering*, 58(4): 281–286.

Dwivedula, R., Bredillet, C., & Müller, R. 2013. Work motivation as a determinant of organisational and professional commitment in temporary organisations: theoretical lenses and propositions. *Journal of Project, Program & Portfolio Management*, 4(1): 11–29.

Fabo, B., et al. 2017. *An overview of European Platforms*: *Scope and Business Models*. Luxembourg: Publications Office of the European Union.

Faullant, R., & Dolfus, G. 2017. Everything community? Destructive processes in communities of crowdsourcing competitions. *Business Process Management Journal*, 23(6): 1108–1128.

Felfe, J., et al. 2014. Commitment Organisation, Beruf und Beschäftigungsform (COBB). *Zusammenstellung sozialwissenschaftlicher Items und Skalen*, https://doi.org/10.6102/zis9.

Feng, Y., et al. 2018. Gamification artifacts and crowdsourcing participation: Examining the mediating role of intrinsic motivations. *Computers in Human Behavior*, 81: 124–136.

Fiss, P. C. 2011. Building Better Causal Theories: A Fuzzy Set Approach to Typologies in Organization Research. *Academy of management journal*, 54(2): 393–420.

Fiss, P. C., Sharapov, D., & Cronqvist, L. 2013. Opposites Attract? Opportunities and Challenges for Integrating Large-N QCA and Econometric Analysis. *Political Research Quarterly*, 66(1): 191–198.

Franke, N., Keinz, P., & Klausberger, K. 2013. "Does This Sound Like a Fair Deal?": Antecedents and Consequences of Fairness Expectations in the Individual's Decision to Participate in Firm Innovation. *Organization Science*, 24(5): 1495–1516.

Frazier, M. L., Tupper, C., & Fainshmidt, S. 2016. The path(s) to employee trust in direct supervisor in nascent and established relationships: A fuzzy set analysis. *Journal of Organizational Behavior*, 37(7): 1023–1043.

Füller, J., et al. 2014. User Roles and Contributions in Innovation-Contest Communities. *Journal of Management Information Systems*, 31(1): 273–308.

Füller, J., Hutter, K., & Fries, M. 2012. Crowdsourcing for Goodness Sake: Impact of Incentive Preference on Contribution Behavior for Social Innovation, *Interdisciplinary Approaches to Product Design, Innovation, & Branding in International Marketing*: 137–159: Emerald Group Publishing Limited.

Gabriel, A. S., et al. 2018. Fuzzy profiles: Comparing and Contrasting Latent Profile Analysis and Fuzzy Set Qualitative Comparative Analysis for Person-Centered Research. *Organizational Research Methods*, 21(4): 877–904.

Gadiraju, U., et al. 2017. Using Worker Self-Assessments for Competence-based Pre-Selection in Crowdsourcing Microtasks. *ACM Transactions on Computer-Human Interaction*, 24(4): 1–26.

Giard, N., et al. 2019. *Interdisziplinäre Befragung von Crowdworkern*: *Technical Report.* Research Institute for Cognition and Robotics. Bielefeld.

Goertz, G. 2020. *Social Science Concepts and Measurement: New and Completely Revised Edition* (2nd ed.). Princeton: Princeton University Press.

Goes, P. B., Guo, C., & Lin, M. 2016. Do Incentive Hierarchies Induce User Effort? Evidence from an Online Knowledge Exchange. *Information Systems Research*, 27(3): 497–516.

Goh, D. H.-L., Pe-Than, E. P. P., & Lee, C. S. 2017. Perceptions of virtual reward systems in crowdsourcing games. *Computers in Human Behavior*, 70: 365–374.

Gong, Y., et al. 2009. Human Resources Management and Firm Performance: The Differential Role of Managerial Affective and Continuance Commitment. *Journal of Applied Psychology*, 94(1): 263–275.

Gupta, S., & Kim, H.-W. 2007. Developing the Commitment to Virtual Community. *Information Resources Management Journal*, 20(1): 28–45.

Hemsen, P., et al. 2021. Crowdsourcing for paid work as a new form of employment relationship: A content analysis. ***Working Paper***.

Hemsen, P. 2021. How do rating-based compensation systems on crowdworking platforms work? Providing long-term and reputational compensations for expert crowdworkers. ***Working Paper***.

Horton, J. J., & Chilton, L. B. 2010. The Labor Economics of Paid Crowdsourcing. ***Proceedings of the 11th ACM conference on Electronic commerce***: 209–218.

Kittinger, R. S. 2015. ***Incentives that increase user-generated-content production in virtual environments***: ***A quantitative analysis of crowd-sourced labor productivity over time***. Capella: Capella University.

Kittur, A., Nickerson, J. V., Bernstein, M. S., Gerber, E. M., Shaw, A., Zimmerman, J., Lease, M., & Horton, J. J. (Eds.) 2013. ***The Future of Crowd Work***. New York, NY: ACM.

Kuek, S. C., et al. 2015. ***The global opportunity in online outsourcing***. World Bank Group: Washington, DC.

Lakhani, K. R., & Wolf, R. G. 2003. Why Hackers Do What They Do: Understanding Motivation Effort in Free/Open Source Software Projects. ***MIT Sloan School of Management: Working Paper***, 4425(3): 1–27.

Leimeister, J. M., et al. 2009. Leveraging Crowdsourcing: Activation-Supporting Components for IT-Based Ideas Competition. ***Journal of Management Information Systems***, 26(1): 197–224.

Liang, H., et al. 2018. How Intrinsic Motivation and Extrinsic Incentives Affect Task Effort in Crowdsourcing Contests: A Mediated Moderation Model. ***Computers in Human Behavior***, 81: 168–176.

Liu, S., et al. 2016a. How crowdsourcing risks affect performance: An exploratory model. ***Management Decision***, 54(9): 2235–2255.

Liu, X., Schuckert, M., & Law, R. 2016b. Online Incentive Hierarchies, Review Extremity, and Review Quality: Empirical Evidence from the Hotel Sector. ***Journal of Travel & Tourism Marketing***, 33(3): 279–292.

López-Cabarcos, M. Á., Vázquez-Rodríguez, P., & Piñeiro-Chousa, J. R. 2016. Combined antecedents of prison employees' affective commitment using fsQCA. ***Journal of Business Research***, 69(11): 5534–5539.

Maier, G. W., & Woschée, R.-M. 2014. Deutsche Fassung des Organizational Commitment Questionnaire (OCQ-G). *Zusammenstellung sozialwissenschaftlicher Items und Skalen*, doi: 10.6102/ZIS10.

Marx, A. 2010. Crisp-set qualitative comparative analysis (csQCA) and model specification: Benchmarks for future csQCA applications. *International journal of multiple research approaches*, 4(2): 138–158.

Mason, W., & Watts, D. J. 2009. Financial Incentives and the "Performance of Crowds". *Proceedings of the ACM SIGKDD Workshop on Human Computation (HCOMP '09)*, 11(2): 100–108.

Mathieu, J. E., & Zajac, D. M. 1990. A Review and Meta-Analysis of the Antecedents, Correlates, and Consequences of Organizational Commitment. *Psychological Bulletin*, 108(2): 171–194.

McCormick, L., & Donohue, R. 2019. Antecedents of affective and normative commitment of organisational volunteers. *The International Journal of Human Resource Management*, 30(18): 2581–2604.

Mercurio, Z. A. 2015. Affective Commitment as a Core Essence of Organizational Commitment: An Integrative Literature Review. *Human Resource Development Review*, 14(4): 389–414.

Meuer, J., & Rupietta, C. 2017a. A review of integrated QCA and statistical analyses. *Quality & Quantity*, 51(5): 2063–2083.

Meuer, J., & Rupietta, C. 2017b. Integrating QCA and HLM for Multilevel Research on Organizational Configurations. *Organizational Research Methods*, 20(2): 324–342.

Meyer, J. P., et al. 2002. Affective, Continuance, and Normative Commitment to the Organization: A Meta-analysis of Antecedents, Correlates, and Consequences. *Journal of Vocational Behavior*, 61(1): 20–52.

Meyer, J. P. 2016. Employee commitment: an introduction and roadmap. In J. P. Meyer (Ed.), *Handbook of Employee Commitment*: 3–12 (1st ed.). Cheltenham, UK: Edward Elgar Publishing.

Meyer, J. P., & Allen, N. J. 1991. A three-component conceptualization of organizational commitment. *Human Resource Management Review*, 1(1): 61–89.

Meyer, J. P., Allen, N. J., & Smith, C. A. 1993. Commitment to Organizations and Occupations: Extension and Test of a Three-Component Conceptualization. *Journal of Applied Psychology*, 78(4): 538–551.

Meyer, J. P., & Morin, A. J. S. 2016. A person-centered approach to commitment research: Theory, research, and methodology. *Journal of Organizational Behavior*, 37(4): 584–612.

Meyer, J. P., Stanley, L. J., & Parfyonova, N. M. 2012. Employee commitment in context: The nature and implication of commitment profiles. *Journal of Vocational Behavior*, 80(1): 1–16.

Misangyi, V. F., et al. 2017. Embracing Causal Complexity: The Emergence of a Neo-Configurational Perspective. *Journal of Management*, 43(1): 255–282.

Morschheuser, B., Hamari, J., & Koivisto, J. 2016. Gamification in Crowdsourcing: A Review. *49th Annual Hawaii International Conference on System Sciences (HICSS)*: 4375–4384.

Moser, C., et al. 2012. Revisiting personas: the making-of for special user groups. *CHI '12 Extended Abstracts on Human Factors in Computing Systems*: 453–468.

Mowday, R. T., Porter, L. W., & Steers, R. M. 1982. *Employee - Organization Linkages*: *The Psychology of Commitment, Absenteeism and Turnover* (1st ed.). New York: Academic Press.

Paolacci, G., Chandler, J., & Ipeirotis, P. G. 2010. Running Experiments on Amazon Mechanical Turk. *Judgment and Decision making*, 5(5): 411–419.

Pee, L. G., Koh, E., & Goh, M. 2018. Trait Motivations of Crowdsourcing and Task Choice: A Distal-Proximal Perspective. *International Journal of Information Management*, 40: 28–41.

Peer, E., Vosgerau, J., & Acquisti, A. 2014. Reputation as a sufficient condition for data quality on Amazon Mechanical Turk. *Behavior research methods*, 46(4): 1023–1031.

Puranam, P., Alexy, O., & Reitzig, M. 2014. What's "new" about new forms of organizing? *Academy of Management Review*, 39(2): 162–180.

Ragin, C. C. 2000. *Fuzzy-Set Social Science* (1st ed.). Chicago: University of Chicago Press.

Ragin, C. C. 2009. *Redesigning social inquiry: Fuzzy sets and beyond*. Chicago, London: University of Chicago Press.

Ragin, C. C., & Davey, S. 2016. Fuzzy-Set/Qualitative Comparative Analysis 3.0. Irvine, California: Department of Sociology, University of California. *Irvine, California:*

Department of Sociology, University of California. http://www. socsci. uci. edu/ cragin/fsQCA/software. shtml.

Rhoades, L., Eisenberger, R., & Armeli, S. 2001. Affective commitment to the organization: The contribution of perceived organizational support. *Journal of Applied Psychology*, 86(5): 825-638.

Rubinson, C., et al. 2019. Avoiding Common Errors in QCA: A Short Guide for New Practitioners. *Sociology*, 9: 397–418.

Schneider, C. Q. 2018. Realists and Idealists in QCA. *Political Analysis*, 26(2): 246–254.

Schneider, C. Q., & Wagemann, C. 2012. *Set-Theoretic Methods for the Social Sciences*: *A Guide to Qualitative Comparative Analysis* (1st ed.). Cambridge: Cambridge University Press.

Schneider, M. R., & Flore, J. 2019. Training and commitment in a German manufacturing company during the post-2008 crisis: a case of internal flexicurity. *The International Journal of Human Resource Management*, 30(10): 1666–1682.

Schörpf, P., et al. 2017. Triangular love–hate: Management and control in creative crowdworking. *New Technology, Work and Employment*, 32(1): 43–58.

Schulte, J., Schlicher, K. D., & Maier, G. W. 2020. Working everywhere and every time? Chances and risks in crowdworking and crowdsourcing work design. *Gruppe. Interaktion. Organisation. Zeitschrift für Angewandte Organisationspsychologie (GIO)*, 51(1): 59–69.

Schulten, M. B., & Schaefer, F. 2015. Affective commitment and customer loyalty in crowdsourcing: antecedents, interdependencies, and practical implications. *The International Review of Retail, Distribution and Consumer Research*, 25(5): 516–528.

Schulze-Bentrop, C. 2013. *Qualitative comparative analysis (QCA) and configurational thinking in management studies*. Frankfurt am Main: Peter Lang.

Shore, L. M., et al. 2006. Social and Economic Exchange: Construct Development and Validation. *Journal of Applied Social Psychology*, 36(4): 837–867.

Spanuth, T., & Wald, A. 2017. Understanding the antecedents of organizational commitment in the context of temporary organizations: An empirical study. *Scandinavian Journal of Management*, 33(3): 129–138.

Stewart, O., Lubensky, D., & Huerta, J. M. 2010. Crowdsourcing Participation Inequality: A SCOUT Model for the Enterprise Domain. *Proceedings of the ACM SIGKDD Workshop on Human Computation*: 30–33.

Tajfel, H., et al. 2004. An integrative theory of intergroup conflict. In M. J. Hatch & M. Schultz (Eds.), *Organizational identity: A reader*: 56–65: Oxford University Press on Demand.

Vroom, V. H. 1964. *Work and motivation*. New York: Wiley.

Whitener, E. M., & Walz, P. M. 1993. Exchange Theory Determinants of Affective and Continuance Commitment and Turnover. *Journal of Vocational Behavior*, 42(3): 265–281.

Ye, H. J., & Kankanhalli, A. 2017. Solvers' participation in crowdsourcing platforms: Examining the impacts of trust, and benefit and cost factors. *Journal of Strategic Information Systems*, 26(2): 101–117.

Zhao, Y., & Zhu, Q. 2014. Evaluation on crowdsourcing research: Current status and future direction. *Information Systems Frontiers*, 16(3): 417–434.

Zheng, H., Li, D., & Hou, W. 2011. Task Design, Motivation, and Participation in Crowdsourcing Contests. *International Journal of Electronic Commerce*, 15(4): 57–88.

Zhong, Q. Y., Wang, Y. J., & Qiu, J. N. 2011. Empirical research on uses' continuous participation behavior in crowdsourcing community. *Journal of Dalian University of Technology (Social Sciences)*, 32(1): 1–6.