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Who Gets the Job? Synthesis of Literature Findings on Provider Success in Crowdsourcing Marketplaces

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Abstract

Background: Over the past decade, crowdsourcing marketplaces — online exchange platforms which facilitate commercial outsourcing of services — have witnessed a dramatic growth in the number of participants (service providers and customers) and the value of outsourced services. Deciding about the most appropriate provider is a key challenge for customers in crowdsourcing marketplaces because available information about providers may be incomplete and sometimes irrelevant for customer decisions. Ineffective information impedes many service providers to develop long-term relationships with customers, obtain projects on a regular basis and survive on crowdsourcing marketplaces. Previous studies have investigated the impact of a range of factors on customers' choice decisions and providers' success, given the important role of customer-provider relationship development for long-term success on crowdsourcing marketplaces.

Method: This paper reviews the literature of crowdsourcing marketplaces with the aim of developing a comprehensive list of factors that influence customers' choice decisions and providers' success.

Results: We found 31 conceptually distinct profile information components/factors that determine customers' choices and providers' business outcomes on crowdsourcing marketplaces.

Conclusion: We classified these 31 factors into five major categories: 1) prior relationship between a customer and a provider or a customer's invitation, 2) providers' bidding behavior, 3) crowdsourcing marketplace or auction characteristics, 4) providers' profile information, and 5) customer characteristics. The main factors in each category, associated considerations, related literature gaps and avenues for future research are discussed in detail.

Keywords: Marketplaces, Crowdsourcing, Literature Review, Customer Choice, Provider Success.

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Introduction

Global outsourcing of services through crowdsourcing marketplaces is increasingly becoming the norm (Gefen & Carmel, 2013; Kim & Wulf, 2009, 2010; Steelman et al., 2014). The world's first widely-known crowdsourcing marketplace, Elance.com, was launched in 1999 (Radkevitch et al., 2006). However, it was not until 2006 that the term “crowdsourcing” was first introduced by Howe in a Wired Magazine article (Zhao & Zhu, 2014). Howe (2006) defined crowdsourcing as “the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call” (available online at: <https://www.wired.com/2006/06/crowds/>). Although this definition is highly inclusive and yet applicable to today's crowdsourcing after almost two decades of evolution, this research adopts more recent definitions of crowdsourcing, in which the explicit role of online technologies for outsourcing service projects to a talented crowd is more evident. Saxton et al. (2013), for example, defined crowdsourcing as “a sourcing model in which organizations use predominantly advanced Internet technologies to harness the efforts of a virtual crowd to perform specific organizational tasks” (p. 3). In fact, crowdsourcing is an emerging artefact of the most recent developments in IT, especially Web 2.0 and online social networks, which enable virtual communication, collaboration and complex social interactions among customers and unknown service providers from all over the world (Zhao & Zhu, 2014). The term “crowdsourcing” is not used in this research to refer to long-term contract service outsourcing, outsourcing of micro-jobs/micro-tasks to a large collaborating/contesting crowd or crowdfunding.

Furthermore, of the two general models of crowdsourcing, i.e., “contract” and “contest” models, this research studies the former in which a customer chooses the best provider based on their online profile and proposal (W. Guo et al., 2017, p. 2). This is unlike the contest model in which providers develop their solutions for a given project with a predetermined reward, and the corresponding customer chooses the best solution (W. Guo et al., 2017). Freelancer.com, Upwork.com (formerly Elance.com and oDesk.com) and Amazon MTurk are well-known, active crowdsourcing marketplaces studied by previous research (e.g., Banker & Hwang, 2008; Burnham et al., 2018; Cheung et al., 2017; Difallah et al., 2015; Gefen & Carmel, 2013; Hong et al., 2015; Kim & Wulf, 2009, 2010) and which fit the proposed definition.

A crowdsourcing marketplace (CM) (also known as online labor market or online outsourcing platform) is a global virtual exchange environment through which customers commercially outsource their required services to competent, usually freelance, providers (W. Guo et al., 2017; Nevo & Kotlarsky, 2020; Qi & Mao, 2016). The market size of CMs is substantial and growing fast in terms of both the number of participants and the volume of transactions (Horton et al., 2017).

A crowdsourcing marketplace is a special type of electronic marketplace (EM) — physical, virtual, or conceptual intermediary where buyers and sellers electronically transact with each other — that is customized for and dedicated to the transaction of services (and not physical goods) (Turban et al., 2017). Given this definition and classification of crowdsourcing marketplaces, a crowdsourcing marketplace can also be considered as a special type of a two-sided market (Ayaburi et al., 2015; Tajedin & Nevo, 2014) — a two-sided platform which creates value through facilitating transactions between two distinct, yet interdependent groups (i.e., customers and providers in a crowdsourcing marketplace) (Eisenmann et al., 2006; Muzellec et al., 2015).

There are always three main players involved in a given crowdsourcing transaction which impact on the outcome of the transaction, and thus the overall performance of the crowdsourcing marketplace (Nevo & Kotlarsky, 2020; Wei et al., 2014; Zhao & Zhu, 2014), as is the case with any EM or two-sided market (Eisenmann et al., 2006). These players include customers (also known as requesters, employers, or clients), providers (also known as

freelancers, suppliers or crowdworkers) and market makers. Customers and providers in crowdsourcing marketplaces are typically small- to medium-sized enterprises or individuals (Hong & Pavlou, 2017; Kim & Wulf, 2010), although large companies (e.g., Google, VeriSign and Polo) have also started transacting through these marketplaces (Lu & Hirschheim, 2011). Market makers, the owners/managers of a crowdsourcing marketplace, design the process and provide the intermediary platform that facilitate crowdsourcing transactions between customers and providers (Wei et al., 2014; Zhao & Zhu, 2014).

Whereas a small set of providers may register on CMs for reasons other than monetary benefits (e.g., curiosity), the vast majority join in for income generation (Elance.com, 2010). Many providers, however, fail to secure a sustainable and steady stream of significant revenue (Banker et al., 2011; Gefen et al., 2016; Kanat et al., 2018). For instance, as of July 2018, amongst more than 400,000 providers on Upwork.com in the category of 'web, mobile and software development', less than 10% managed to make more than \$1,000 since they have registered (Upwork.com, 2018). In a survey of 700 providers by Elance.com in (2010), 97% asserted that acquiring new customers and having a continuous job stream is a serious challenge on CMs. Overall, the high level of failure among providers is a recognized issue in crowdsourcing industry (Assemi & Schlagwein, 2012; Ghezzi et al., 2018).

The high level of failure among CM providers has drawn the attention of researchers to the concept of signaling (Spence, 2002) associated with provider profiles. In the absence of face-to-face interactions and real-world acquaintances between customers and providers, public profiles are the primary, if not the only, source of information for customers in the early stages of decision-making and relationship development with providers (Banker & Hwang, 2008; Banker et al., 2011; Gefen & Carmel, 2008, 2013). The information on provider profiles (such as average rating, service description, and skill certificates) signals the reputation, credibility, trustworthiness, and past performance of profile owners and shapes customers' decisions as to whom to crowdsource their projects (Banker & Hwang, 2008; Guan et al., 2020; Holthaus & Stock, 2018; Xu et al., 2021).

Overall, the literature on information signaling in CMs (Banker et al., 2011; Gefen et al., 2016; W. Guo et al., 2017; Hong & Pavlou, 2017) ascertains that the information contained in provider profiles plays an imperative role in inducing customers to choose (or not to choose) a provider. Several studies in the past have empirically explored the impact of various profile information on customers' choice and providers' success (e.g., Kanat et al., 2018; Kim & Wulf, 2009; Liang et al., 2018). However, as the information components on the provider profiles is relatively diverse (and slightly different from one CM platform to another) each of the past studies have considered a handful of profile information components and ignored many others. Consequently, there is no consolidated, inclusive and structured understanding of the impact of profile information on providers' success. Furthermore, the current findings and evidence in the literature are sometimes inconsistent or even contradictory.

To address this shortcoming, we undertook a comprehensive literature review to synthesize the current knowledge in the literature on the role of profile information components on providers' success, identify the potential gaps in the knowledge, and shed light on opportunities for future research. Through scrutiny into state-of-the-art research on CMs, we identified 31 conceptually distinct profile information components and categorized them into 5 main categories. We also synthesized the findings in the literature on each individual profile information components as well as the broader categories to uncover the areas and aspects that still demands further attention and exploration by future research.

The remainder of this paper is structured as follow: Section 2 briefly discusses the background of research and locates CMs within the broader context of electronic marketplaces (EMs). Section 3 presents the research method and steps followed for the literature review. Section

4 presents the findings of the study. Section 5 discusses the main literature review findings and concludes the paper by providing directions for future research.

Background

A Taxonomy of Electronic Marketplaces

Electronic Marketplaces (EMs), as a special type of two-sided markets, are any virtual or conceptual intermediaries where buyers (or customers) and sellers (or providers) electronically transact physical goods or services (O'Reilly & Finnegan, 2005; Wang & Archer, 2007). This is made possible through the provision of electronic communication, information transfer and fundamental market functions (O'Reilly & Finnegan, 2005; Rossignoli & Ricciardi, 2015). The term “electronic marketplace” has been used in the literature to refer to a wide range of virtual exchange environments with some similarities and fundamental differences (Alt & Klein, 2011; Rossignoli & Ricciardi, 2015; Wang & Archer, 2007).

This research recognizes three major categories of EMs with fundamental governance or business model differences. These three categories include: 1) online retailing marketplaces (also known as e-catalogues), 2) online auctioning marketplaces for goods, and 3) crowdsourcing marketplaces (CMs). While the first two categories often facilitate the transaction of commodities and physical goods, the last category is usually used to transact services. Table 1 summarizes the main characteristics of the three categories of EMs. In the remainder of this section, we briefly review the three categories of EMs to further clarify the need for studying the role of providers' profile information in crowdsourcing marketplaces.

Table 1 - Categorization of EMs				
Category	Exchange Objects	Transacting Parties	Exchange Mechanism	Examples
Online retailing marketplaces	Physical goods and commodities	Business sellers, business and individual buyers	Online shopping (fixed prices)	Amazon, E*Trade and letsbuyit.com
Online auctioning marketplaces for goods	Physical goods	Individual sellers and buyers	Online auctions	eBay, uBid.com and Priceline.com
Crowdsourcing marketplaces	Services	Business and individual customers and providers	Online reverse auctions	Freelancer.com, Upwork.com and MTurk

Online Retailing Marketplaces

Online retailing marketplaces (also known as electronic/online retailers, e-retailers or e-tailers) such as Amazon, E*Trade, and letsbuyit.com (Elliot & Fowell, 2000; Kotzab & Madlberger, 2001) form a major category of EMs. According to Kotzab and Madlberger (2001), online retailing marketplaces are a specific subset of “non-store based” retailers that trade with their customers through the Internet (i.e., “virtual stores”) instead of physical shops. Online retailing marketplaces have always possessed the largest share of global e-commerce revenue among different types of EMs and have been growing in terms of the number of participants as well as total sales (Zhang et al., 2011).

Online Auctioning Marketplaces

Online auctioning marketplaces are another important category of EMs which has widely been studied in the literature (Hsu, 2009; Möllenberg, 2004; Vulkan, 2003). An online auctioning marketplace, such as eBay, uBid.com and Priceline.com, provides an exchange environment for both buyers (or customers) and sellers (or suppliers) to efficiently transact goods that are not typically cost-effective to be traded in the traditional global markets (Hou & Blodgett, 2010). These marketplaces use online auctions as the main exchange mechanism between transacting parties, and thus prices are often determined dynamically in the auction process (Turban et al., 2017). Similar to online retailing marketplaces, this category of EMs has demonstrated a remarkable growth in terms of the number of participants as well as total sales (Hou & Blodgett, 2010; Hsu, 2009; Möllenberg, 2004). According to IBISWorld (2019) the total sales volume of online auctioning marketplaces reaches US\$513 billion in the US in 2019, showing an annual growth rate of 12.8 per cent over 5 years ending in 2019.

On an online auctioning marketplace for goods, sellers can simply offer their goods and products to a large pool of likely customers, bearing very low transaction overheads (Hou & Blodgett, 2010). Customers in these marketplaces can also find almost every item that they often need at a reasonable price (i.e., usually lower than the price of the same item in traditional markets). Although prices are affected by the characteristics and the behavior of transacting parties, the economic theory predicts “equilibrium prices” for these marketplaces because of their similarities with pure market structures (Hou & Blodgett, 2010).

Crowdsourcing Marketplaces

Crowdsourcing marketplaces are the third major category of EMs, specifically designed to facilitate the online exchange of services between customers (individuals or organizations) and service providers (Holthaus & Stock, 2017; Hong & Pavlou, 2017; Kim & Wulf, 2010). Often through an open call for a specific service solution, a customer seeks a service provider that fits the customer’s unique requirements/expectations (Turban et al., 2017). An online reverse auction is usually used by customers to find the most suitable provider, where all relevant providers can propose their solutions and prices (Walter, 2013).

Considering this aspect, the term “crowdsourcing marketplace” is used throughout this paper to refer to “general-purpose” EMs, in which all types of services (e.g., software development, marketing and virtual administration) are being transacted, such as Upwork.com and Freelancer (Estellés-Arolas et al., 2015; Kim & Wulf, 2010; Turban et al., 2017).

Differences Between Crowdsourcing Marketplaces and Other EMs

Although crowdsourcing marketplaces have some similarities with other EMs, they significantly differ from each other in several aspects (Love & Hirschheim, 2017; Saxton et al., 2013), as summarized in Table 2. Overall, online retailing marketplaces and online auctioning marketplaces mostly focus on physical goods; however, crowdsourcing marketplaces are mainly designed to offer and exchange services (Lin et al., 2018; Yoganarasimhan, 2013). Furthermore, the intangible and highly specific nature of exchange objects (i.e., services) on crowdsourcing marketplaces requires customers to evaluate the profile information of providers much more comprehensively, compared to customers’ evaluation of seller profiles on EMs for goods. Accordingly, provider profiles play a more important role in customers’ decision-making and providers’ business outcomes on crowdsourcing marketplaces (Yoganarasimhan, 2013). Moreover, the information components on these profiles play a different role compared to their potential counterparts on seller profiles on an EM for goods (if such components exist at all). This is because of the distinct importance of the information components related to providers’ characteristics (e.g., cultural background and language) as

well as their past performance in similar projects on a crowdsourcing marketplace, whereas such factors are almost irrelevant for customers' decision-making on an EM for goods.

As providers are often paid for each project through multiple instalments, the state of their previous projects is displayed on their profiles (i.e., completed, in-progress, cancelled or disputed) and can affect their payment agreements with customers. Furthermore, the more comprehensive reputation management mechanisms on crowdsourcing marketplaces can cause a more complex impact of providers' profile information on customers' choice decisions and the providers' business outcomes, compared to a similar impact of seller profiles on EMs for goods. This is an important area to investigate, as the price is not simply determined by a given provider on crowdsourcing marketplaces, neither it is necessarily the most important determinant of customers' choices (Yoganarasimhan, 2013).

Table 2 - A comparison between crowdsourcing marketplaces and EMs for goods

EM Element	Crowdsourcing Marketplaces	EMs for Goods
Inputs	<ul style="list-style-type: none"> ▪ Intangible, hard to specify, and usually unique services as exchange objects ▪ Continuous communication and information exchange required for clarifications ▪ Cultural and language differences matter 	<ul style="list-style-type: none"> ▪ Tangible, simple to specify, and usually standard products as exchange objects ▪ Physical distance and associated delivery costs matter
Processes	<ul style="list-style-type: none"> ▪ Project progress monitoring, escrow accounts and instalments ▪ Real-time information exchange mechanisms ▪ Comprehensive reputation management mechanisms ▪ Reverse auctions as demand–supply matching mechanism ▪ Price and technical proposal jointly considered to determine the winning provider 	<ul style="list-style-type: none"> ▪ One-off product purchase and payment ▪ Simple product and seller review mechanisms ▪ Simple product purchase or English auction as demand–supply matching mechanism ▪ Price is the main determinant of the winning seller
Outputs	<ul style="list-style-type: none"> ▪ Optimum technical solution and service price combined 	<ul style="list-style-type: none"> ▪ Optimum net saving and product price

Finally, it is often much harder for customers on a crowdsourcing marketplace, compared to an EM for goods, to ensure that a given provider can deliver the transaction outcome (i.e., a service) as expected (Hong & Pavlou, 2017; Zheng et al., 2015). Accordingly, customers highly rely on the marketplace's lateral system outputs, namely previous customers' feedback ratings and comments about providers, to choose a provider. Therefore, the corresponding information components on provider profiles have a distinctive impact on customers' choice decisions and providers' business outcomes on crowdsourcing marketplaces.

Most previous studies on EMs for goods have considered the impact of different characteristics of online reviews on the usefulness of these reviews for potential customers (Kokkodis & Ipeiritis, 2016). Among these characteristics, informativeness, persuasiveness, quantity and source credibility have been shown by previous research to have an impact on the usefulness and perceived credibility of online reviews (Jiménez & Mendoza, 2013; Zhang et al., 2014). Multiple studies have investigated such an impact in more detail by evaluating the content and verbal features of online reviews (e.g., Archak et al., 2011; Ludwig et al., 2013). However, due to the fundamental differences between crowdsourcing marketplaces and other types of EMs, many aspects of online product reviews (e.g., reviewers' trustworthiness) that

have been shown to have a significant impact on customers' choices (Jiménez & Mendoza, 2013) are rather irrelevant on crowdsourcing marketplaces. As a result, our knowledge about customer–provider relationship development in crowdsourcing marketplaces is not complete and demands further investigation (Holthaus & Stock, 2018; Lin et al., 2018; Moreno & Terwiesch, 2014). The present paper therefore seeks to synthesize and consolidate the current knowledge in the literature in terms of the impact of profile information on providers' success and uncover the unknowns to guide future research.

Exchange Transactions on Crowdsourcing Marketplaces

An ongoing customer–provider relationship development and active participation of both parties in a crowdsourcing marketplace are vital to the survival and success of the marketplace (Kanat et al., 2018; Pavlou & Dimoka, 2006), as is the case with any two-sided market (Ayaburi et al., 2015; Ghezzi et al., 2018). A crowdsourcing marketplace is a virtual commercial exchange environment, and thus it is necessary for its success that both customers and providers see the economic advantages of transacting through the crowdsourcing marketplace over other alternatives.

A typical sequence of customer–provider interactions in an exchange relationship development on a crowdsourcing marketplace is shown in Figure 1. This sequence is often initiated by a customer who posts a service project's description (usually including technical and financial requirements) on the crowdsourcing marketplace. The sequence is followed by service providers, who have the required skills, bidding on the project through submitting their proposed solutions and prices. If the customer chooses one of the bidding providers to whom to crowdsource the project, the sequence continues between the two parties through bilateral communication, artifact deliveries and milestone payments, all via the marketplace platform. Finally, when the project is completely delivered, the customer pays the final project instalment and posts feedback (usually including numerical ratings and a text comment) about the provider and their performance in the project (Walter, 2013). This feedback is often available to the public along with the corresponding project details

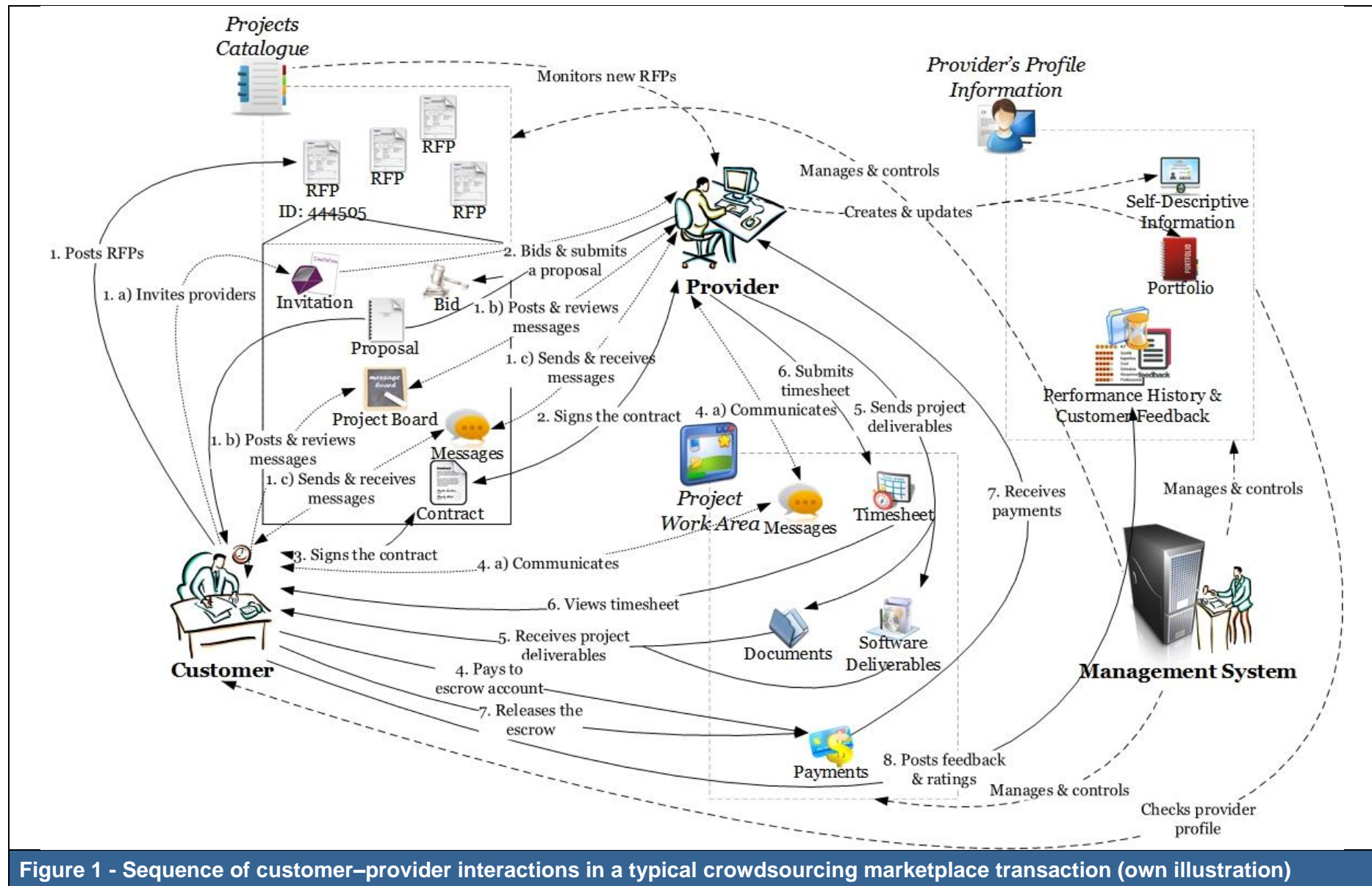


Figure 1 - Sequence of customer-provider interactions in a typical crowdsourcing marketplace transaction (own illustration)

As proposed by Dwyer et al. (1987) in their widely recognized framework of buyer–seller (customer–provider) relationship development, every exchange relationship is developed through four consecutive distinct phases of interactions among the transacting parties. These four consecutive phases are “awareness”, “exploration”, “expansion” and “commitment,” respectively (p. 15). The characteristics of dyadic interactions are different in each phase because the relationship between the transacting parties is gradually deepened during these phases. These four phases and the main characteristics of the relationships between the transacting parties in each phase are shown in Figure 2

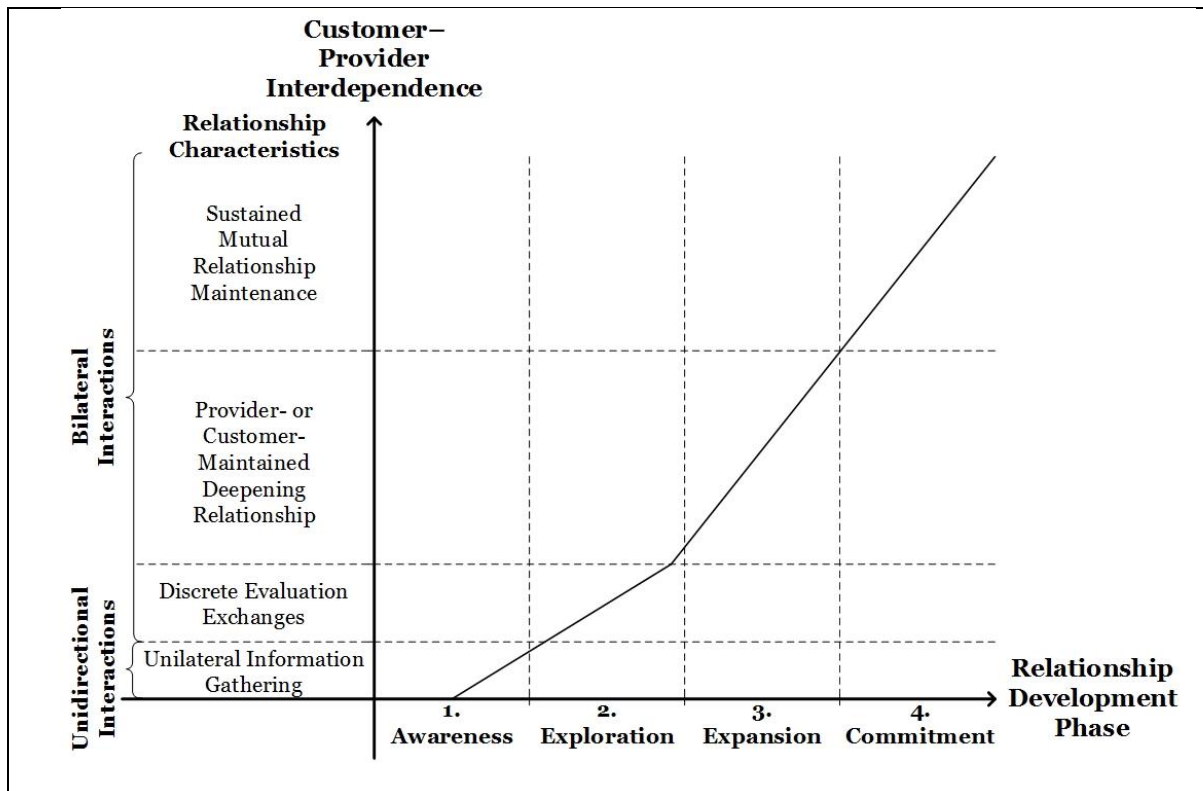


Figure 2 - Four phases of customer–provider relationship development, adapted from Dwyer et al. (1987)

Considering the development of a typical exchange relationship on a crowdsourcing marketplace over these four phases, such a relationship is always initiated with a customer’s awareness of potentially competent providers. The awareness phase encompasses bounded, unilateral interactions of the customer aiming to recognize potentially competent providers. Thus, “positioning” or “posturing” behavior of providers are the main indicators of the awareness phase to emphasize their competence and excellence over their rivals (Dwyer et al., 1987, pp. 15-16). As a distinctive characteristic of crowdsourcing marketplaces (as opposed to other types of EMs), providers often use their online reputation as a significant means to enhance their pricing power on these marketplaces (Moreno & Terwiesch, 2014).

The information gathered by a customer about a provider at this phase forms the customer’s expectations from their relationship development with the provider. Thus, each single piece of information about a provider can significantly influence the process of relationship development between the two parties. Furthermore, the extent to which subsequent interactions among the two parties satisfy the customer’s expectations (formed during the awareness phase) significantly influences the whole process of relationship development between them. In a crowdsourcing marketplace, a provider’s public profile is the major source of information for customers at the awareness phase (Holthaus & Stock, 2018).

The exploration phase begins with the first, discrete occurrence of bilateral interactions between the customer and the provider. The primary dyadic interactions in this phase often encompass the cost–benefit evaluation of the emerging relationship. In fact, each transacting party tries to evaluate/attract the other party and to deepen the emerging relationship if they find it beneficial. In contrast with EMs for goods, however, price is not the most important determinant of such an evaluation, and both parties also need to evaluate each other's online reputation in extreme detail (Moreno & Terwiesch, 2014).

As a potential outcome for this evaluation, the transacting parties may start direct negotiations when they perceive the relationship as being valuable to continue. Although these negotiations are used to establish an initial agreement between the transacting parties, such an agreement is significantly affected by the power inequalities between the two parties. Information asymmetry, which is intrinsically high between the transacting parties in crowdsourcing marketplaces (Banker et al., 2011), is often a major source of power inequalities in these marketplaces (Saam, 2007).

An initial agreement of the transacting parties is potentially followed by the customer's trial transactions with the provider to directly evaluate whether their expectations are confirmed by the provider's performance. Such transactions often provide both parties with a higher level of shared understanding and potentially establish norms, standards, and mutual expectations among the two parties for their current and future exchange relationships. However, because of the loose interdependence between the two parties at this phase, a breakup of the relationship can simply occur.

If the results of the trial transactions at the exploration phase confirm the expectations of both parties, an initial trust emerges among the two parties which indicates the beginning of the expansion phase. Relying on this trust, one transacting party usually starts expanding their relationship with the other party. Indeed, the subsequent transactions at this phase can help strengthening the emerging trust and transforming the relationship between the transacting parties into an implicit or explicit partnership.

The commitment emerges among the transacting parties at the fourth phase of their relationship development, as an important result of both parties' high level of satisfaction and trust in each other, which have usually been established during the previous phases. In fact, the gradually increasing value of the established relationship, as perceived by each transacting party, potentially impedes both parties from exploring new exchange relationships with other equivalently competent parties.

Research Method

Relevant Primary Studies

To conduct our review, we followed the recognized guidelines by Kitchenham et al. (2009) as well as Webster and Watson (2002). To find relevant primary studies, several academic databases (ACM Digital Library, EBSCO BusinessHost, IEEEExplore, Science Direct, Scopus, and Web of Science) were searched using an inclusive list of relevant keywords. To ensure reaching all relevant papers, as shown in Table 3, we used a wide range of keywords in three different groups to capture three distinct concepts associated to our study (group 1: concept of customer and provider, group 2: concept of selection, group 3: concept of CM and EM). Different variations of each keyword were used for literature search; however, these variations are not shown in Table 3 due to space constraints. Moreover, all possible combinations of the keywords from different groups were used in our search string. The 'and' operator was used between the three groups to make sure retrieving those papers that contain at least one keyword from each group. The time scope of the search was 1997 to 2020.

Table 3 - Keywords used in literature review search queries

Keyword Group 1	Keyword Group 2	Keyword Group 3
“customer” or “client” or “buyer” or “provider” or “supplier” or “vendor” or “seller” or “freelancer” or “crowdworker”	“choice” or “select” or “selection” or “decide” or “decision” or “transact” or “transaction” or “purchase” or “outcome” or “revenue” or “earning” or “success” or “sales” or “performance”	“electronic market” or “electronic marketplace” or “electronic service market” or “electronic service marketplace” or “crowdsourcing” or “online programming marketplace” or “online service marketplace” or “online service outsourcing” or “online outsourcing marketplace” or “online auctioning marketplace” or “electronic retail marketplace” or “online retail marketplace” or “online labor marketplace” or “online freelance marketplace” or “job auctioning marketplace”

The initial search (after removing duplications, noises, and entries not in English) resulted in a collection of 1,128 records. We excluded the papers from those disciplines which had no connections to our field of interest (e.g., medicine, arts and humanities, mathematics, material sciences, and chemical engineering). This removed 458 records. We then started the screening process by reviewing the titles and abstracts of the papers through which 132 and 253 papers were excluded, respectively, as they were obviously irrelevant to our study. This left us with 285 papers for full-text screening; from which the papers that satisfied the following criteria through full-text screening were selected for review: a) focused specifically on CMs (and not other types of EMs), b) focused on the business outcomes/success of providers or customer choices, c) presented empirical evidence (opinion papers were excluded for example), d) were from peer-reviewed journal or conference outlets, and e) their full text was available. 30 papers satisfied these criteria. We reviewed the references of these 30 papers (backward search) as well as the citations of them (forward search) (Jafarzadeh et al., 2015a; Jafarzadeh et al., 2015b; Kitchenham et al., 2009) to complement our search strategy. This resulted in finding four new relevant papers. Eventually, 34 primary papers directly related to the purpose of this study were found, which were subsequently analyzed in full depth.

Data Extraction and Analysis

Our data extraction and analysis had two parts: First, extracting and synthesizing the factors (i.e., profile information components) with a proven influence on customers' choice decisions and success of providers in CMs (as evidenced by the primary papers); second, extracting and synthesizing the findings and conclusions of the literature associated with each factor, for example, whether or not its impact on customers' choices and providers' success is found to be significant (either positive or negative) and whether the findings are consistent.

For the first part (extracting the factors), the primary papers were carefully analyzed, and the information components that the researchers explored in their studies were extracted and recorded using the original terms. In the first round, we identified 34 factors based on the terms used in the primary papers. We then merged those that were pointing to the same factor but through different terminologies. For example, the number of completed projects (Hong & Pavlou, 2017; Kim, 2009; Xu et al., 2021; Zheng et al., 2015) has been called provider reputation too (Kanat et al., 2018). This has reduced the list from 34 to 31 factors.

In order to make a better sense of these 31 factors, we sought to categorize them into a number of meaningful clusters. In doing so, we borrowed insights from primary papers (identified through the literature review process) as well as the broader literature on CMs and EMs. In particular, we benefited from previous categorizations in the literature (e.g., Banker & Hwang, 2008; Hong & Pavlou, 2012) and formed 5 categories of: prior relationship between

customers and providers (C1), providers' bidding behavior (C2), crowdsourcing marketplace or auction characteristics (C3), providers' profile information (C4), and customer characteristics (C5). We then categorized the 31 factors across these 5 groups. These categories do not have significant overlaps; however, they are not necessarily mutually exclusive.

To increase our confidence in this classification, a validation test with proportional reduction in loss (PRL) (Rust & Cooil, 1994) was undertaken, which is an indicator to "assess the consensus between judges who are invited to code a number of elements into exclusive qualitative categories" (Ghapanchi & Aurum, 2011, p. 240). Three independent academics knowledgeable in the field were provided with the list of 31 factors (and a description for each) and were asked to map the factors to the five categories (with the option to assign to none if they did not see a fit to any of the categories). Table 4 illustrates a corpus of mapping by the judges and how the inter-judgment agreement was calculated by dividing the total pair-wise agreements to total pair-wise decisions. This proportion for our study was 0.87 which is well above the acceptable level prescribed by Cooil and Rust (1995).

Table 4 - Inter-judge agreement for main categories

Factor	1	Judges 2	3	1 & 2 agree?	1 & 3 agree?	2 & 3 agree?	Agreement	Total
1	C1	C1	C1	Yes	Yes	Yes	3	3
2	C3	C3	C2	Yes	No	No	1	3
3	C2	C2	C2	Yes	Yes	Yes	3	3
4	C4	C1	C1	No	No	Yes	1	3
5	C2	C3	C2	No	Yes	No	1	3
...
Total							81	93
Proportion of inter-judge agreement = $81/93 = 0.87$								

In the second part of data analysis, the primary sources were thoroughly and deeply analyzed and their findings were extracted, synthesized and consolidated. The outcome is explained in the following section.

Findings

This section discusses the major findings of the literature on customers' choices and its antecedents on crowdsourcing marketplaces. Overall, the main antecedents of customers' choices can be categorized into five main groups, as follows:

- prior relationship between a customer and a provider or a customer's invitation;
- providers' bidding behavior;
- crowdsourcing marketplace or auction characteristics;
- providers' profile information; and
- customer characteristics

Figure 3 summarizes the main antecedents of customers' choices in each category. In summary, the provider profile information has been investigated the most, given its potential significant effects on customers' choices in a lack of real-world acquaintance and conventional means to facilitate relationship development. Prior relationship also has a significant impact on customers' choice. While its impact is not as important as it is often in conventional marketplaces, prior relationship plays a more significant role compared to its role in electronic marketplaces for goods. Provider bidding behavior also plays an important, yet complex role in determining customers' choices, as it has multiple aspects (such as price, order and bidding

time) which all influence customers' choices. Customer and auction characteristics have been investigated less due to lack of detailed information on common crowdsourcing marketplaces. The findings of studies relevant to each category are discussed next.

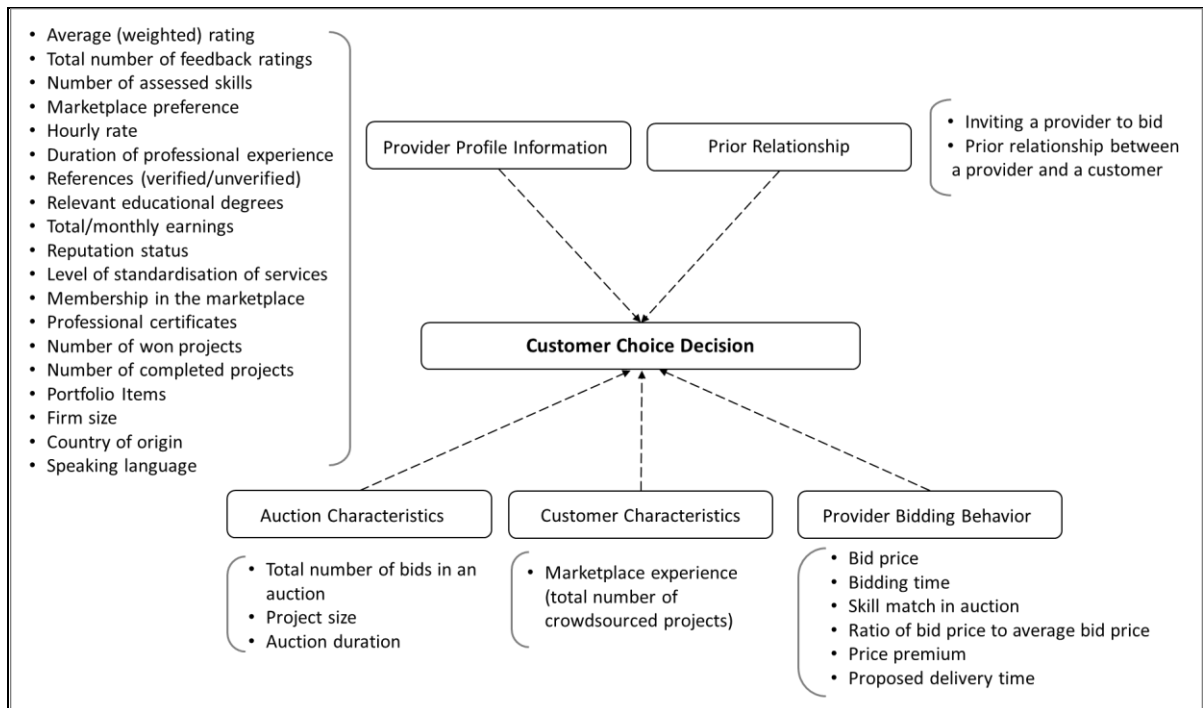


Figure 3 - Antecedents of customers' choices and providers' business outcomes on crowdsourcing marketplaces

Prior Relationship

Our analysis of the literature shows that prior relationship with a provider, or inviting a provider to bid in an auction, significantly impacts customer's decision to choose the provider (Banker & Hwang, 2008; Gefen & Carmel, 2008, 2013; Hong & Pavlou, 2017; Kim, 2009). Table 5 summarizes the main findings of the literature on the impact of prior relationship between customers and providers on customers' choices.

Table 5 - Antecedents of customers' choices – prior relationship category

<i>Antecedent</i>	<i>Impact</i>	<i>Findings</i>	<i>Supporting References</i>
Inviting a provider to bid	Positive	Inviting a provider to bid has a positive impact on the customer's decision to choose the provider.	(Banker & Hwang, 2008; Hong & Pavlou, 2017)
Prior relationship between a provider and a customer	Positive	Prior relationship with a provider significantly impacts on a given customer's decision to choose the provider	(Gefen & Carmel, 2008; Hong & Pavlou, 2017)
	Non-significant	Prior relationship between a provider and a customer does not have a significant impact on the customer's decision to choose the provider	(Kim, 2009)

Generally, customer transactions with providers on crowdsourcing marketplaces encompass a spectrum of relationship patterns from "arm's-length service encounters" to "long-term collaborative service relationships" (Kim & Wulf, 2009; Radkevitch et al., 2009). For instance, according to Kim and Wulf (2009) customers usually explore the potential capabilities of

providers in a crowdsourcing marketplace by transacting with a wide range of new providers at the early stages of their participation in the marketplace. As customers become more experienced, they show a growing preference in repeatedly transacting with a small set of preferred providers, seeking to establish long-term service relationships with these providers.

More specifically, previous research has shown that the exchange relationships of customers with providers on a crowdsourcing marketplace can significantly vary in terms of “share of transactions with their most preferred provider”, “total length of relationships with their most preferred provider”, “ratio of open auctions to private invitations as their exchange method”, “average value of crowdsourced projects” and “average length of crowdsourced projects” (Hong & Pavlou, 2017; Radkevitch et al., 2009).

With arm’s-length relationships, customers often have the lowest share of transactions and the shortest length of relationships with their most preferred provider. Moreover, such customers often use open auctions as their preferred exchange method (Hong & Pavlou, 2017; Radkevitch et al., 2009). This finding is not surprising, as online auctions provide a highly competitive market environment in which customers can efficiently transact with new customers (Kim, 2009; Kim & Wulf, 2009).

With long-term relationships, customers often have the highest share of transactions and the longest length of relationships with their most preferred provider. These customers also have the highest project award ratio, which was also confirmed by Kim and Wulf (2010). These complex relationship patterns and their different consequences warrant further investigation of the different choice processes adopted by customers.

Provider Bidding Behavior

The literature on crowdsourcing marketplaces has shown that providers’ bidding behavior, including their proposed project delivery time, bid price and bid time can impact on a customers’ choices. Relevant literature findings, summarized next, are not conclusive and suggest the necessity of a more in-depth investigation of the impact of providers’ bid prices and time on customers’ choices in crowdsourcing marketplaces. Table 6 summarizes the main findings of the literature on the impact of provider bidding behavior on customers’ choices.

Table 6 - Antecedents of customers’ choices – provider bidding behavior category			
Antecedent	Impact	Findings	Supporting References
Bid price	Negative	A higher bid price negatively impacts on a customer’s decision to crowdsource their projects to the provider	(Banker & Hwang, 2008; Holthaus & Stock, 2018; Hong & Pavlou, 2017; Kim, 2009; Liang et al., 2018; Ögüt, 2013; Zheng et al., 2015)
	Non-significant	Bid price does not impact on a customer’s choice decision	(Gefen & Carmel, 2013)
Bidding time	Positive	Bidding later in an auction is positively associated with the corresponding customer’s decision to choose the respective provider	(Hong & Pavlou, 2017)
	Negative	The later providers bid in an auction, the lower is the likelihood that the customer chooses one of the providers	(Zheng et al., 2015)

Table 6 - Antecedents of customers' choices – provider bidding behavior category

Skill match in auction	Positive	Bidding in an auction where there is a better match between the provider's skills and the project's requirements is positively associated with the corresponding customer's decision to choose the provider	(Hong & Pavlou, 2017; Kanat et al., 2018)
Ratio of bid price to average/winning bid price	Negative	A higher ratio of a provider's bid price to the average bid price and a higher ratio of a provider's bid price to the winning bid price negatively impact on the decision of the respective customer to choose the provider	(Gefen & Carmel, 2008)
Price premium	Negative	A higher price premium negatively impacts on a customer's decision to choose a given provider	(Gefen & Carmel, 2013; Holthaus & Stock, 2018)
Proposed delivery time	Negative	A longer delivery time negatively impacts on a customer's decision to choose the respective provider	(Banker & Hwang, 2008; Kim, 2009; Ögüt, 2013)

Proposed Project Delivery Time

The proposed project delivery time is an attribute of a provider's bidding behavior which has been shown by previous studies to have a significant negative impact on the choice decisions of customers (Banker & Hwang, 2008; Kanat et al., 2018; Kim, 2009; Ögüt, 2013). It is expected to observe such an impact because customers usually prefer to receive their requested services in the shortest possible time. Ögüt (2013), however, showed that the (relative) proposed delivery time is a significant determinant of customers' choices only for low-value projects.

Bid Price

Most previous studies found a significant negative impact of a provider's bid price on a customer's decision to choose the provider (Banker & Hwang, 2008; Gefen et al., 2016; Holthaus & Stock, 2018; Hong & Pavlou, 2017; Kanat et al., 2018; Kim, 2009; Liang et al., 2018; Ögüt, 2013; Zheng et al., 2015). Gefen and Carmel (2008), however, highlighted a rather complex nature of the impact of providers' bid price by showing that a higher ratio of the bid price to either the "winning" or the "average bid price" in an auction has a negative impact on the decision of the respective customer to choose the provider. Similarly, Gefen and Carmel (2013) showed that a higher price premium (i.e., the difference between the bid price and the "average bid price" in an auction divided by the "standard deviation of all bids" in the auction) has a negative impact on the customer's choice decision. Gefen and Carmel (2013) could not find any significant direct effect of bid price on customers' decisions.

Bid Time

Hong and Pavlou (2017) showed that late bidding in an auction is positively associated with the corresponding customer's decision to choose the respective provider. This is because a provider who bids at a later time potentially has more knowledge about the auction and the competitors who have already bidden in the auction (Hong & Pavlou, 2017).

In an opposite way, Zheng et al. (2015) showed that the average bid latency of the providers who participate in an auction is negatively associated with the overall likelihood that the customer chooses one of the providers. This is mainly attributed to the fact that when a customer receives the providers' bid relatively late, their expectation to find a good provider would be lower (so they may choose not to select any bidder). Thus, bidding late in auctions is not necessarily the best strategy for providers to increase their chances of success.

Crowdsourcing Marketplace and Auction Characteristics

The literature has also shown a significant impact of the characteristics of a crowdsourcing marketplace and its auctions on customers' choices (Gefen & Carmel, 2008, 2013; Ögüt, 2013; Zheng et al., 2015). The major relevant literature findings are summarized in Table 7 and discussed in the following.

Table 7 - Antecedents of customers' choices – auction characteristics category			
<i>Antecedent</i>	<i>Impact</i>	<i>Findings</i>	<i>Supporting References</i>
Total number of bids in an auction	Positive	A higher number of providers who bid in an auction is positively associated with the corresponding customer's decision to choose a provider	(Ögüt, 2013)
	Negative	A higher number of providers who bid in an auction negatively impacts on the corresponding customer's decision to choose a provider	(Gefen & Carmel, 2008, 2013; Zheng et al., 2015)
Project size	Negative	A project's size is negatively associated with the likelihood of the project being awarded to a provider in the respective auction	(Zheng et al., 2015)
Auction duration	Positive	Auction duration is positively associated with the likelihood that the customer chooses one of the bidding providers	(X. Guo et al., 2017; Zheng et al., 2015)

Number of Bids

The total number of bids in an auction is a major characteristic of an auction which, according to literature, has a significant, negative impact on the corresponding customer's decision to crowdsource their project to one of the providers (Gefen & Carmel, 2008, 2013; X. Guo et al., 2017; Huang et al., 2020; Xu et al., 2021; Zheng et al., 2015). This can be due to the cost and complexity of choosing the best provider when many providers have bidden in an auction (Snir & Hitt, 2003; Zheng et al., 2015).

By contrast, Ögüt (2013) found the effect of the number of providers bidding in an auction to be positive on the customer's decision to choose a provider. These contradictory findings can be due to unobserved heterogeneity in the models evaluated by the corresponding studies. Customers of different size, who crowdsource different types of services, may react differently to the number of providers bidding in their auctions. For example, a larger number of bids for a small service project is potentially helpful, as the corresponding customer has a wider range of options for crowdsourcing the intended service. In such cases, the bid price is the main determinant of the customer's decision. However, a larger number of bids for a large project means a higher cost of evaluation and more complex decision making for the customer because numerous providers and proposals should be taken into consideration.

Project Size and Auction Duration

Our analysis of the literature revealed that there is a lack of research that particularly focuses on the relationships between project size, auction duration and customers' choices (Gefen et al., 2016; X. Guo et al., 2017; Zheng et al., 2015). Zheng et al. (2015) and X. Guo et al. (2017) are among few studies which examined the impact of project size and auction duration on customers' choices. They found that project size has a negative impact on the decision of the customer. However, the auction duration is positively associated with the likelihood that the respective customer chooses one of the providers for crowdsourcing.

Provider Profile Information

The literature has also investigated the impact of provider profiles' information on customers' choices on crowdsourcing marketplaces. Provider profiles have a pivotal role in facilitating exchange transactions between customers and providers in crowdsourcing marketplaces, and thus scholars have paid more attention to how provider profiles impact on customers' choices compared to the other choice antecedents previously discussed.

The major information components on a provider profile that have been studied in the literature on crowdsourcing marketplaces in terms of their impact on customers' choices include: average (weighted) rating, total number of feedback ratings, total number of passed skill assessments, number of educational degrees, number of professional certificates, reputation status, total earnings, level of standardization of services, extent and duration of professional experience, number of references, dispute resolution program membership, hourly rate, and firm size. Table 8 summarizes the main findings of the literature on the impact of provider profiles on customers' choices.

Table 8 - Antecedents of customers' choices – provider profile category

<i>Antecedent</i>	<i>Impact</i>	<i>Findings</i>	<i>Supporting References</i>
Average (weighted) rating	Positive	A higher average rating positively impacts on customers' choices	(Banker & Hwang, 2008; Banker et al., 2011; Gefen & Carmel, 2013; Hong & Pavlou, 2017; Kim, 2009; Ögüt, 2013; Zheng et al., 2015)
Total number of feedback ratings	Positive	A higher number of feedback ratings on a provider profile is positively associated with the decisions of customers to choose the provider	(Liang et al., 2018; Ögüt, 2013)
	Non-significant	No significant impact of the total number of feedback ratings was found	(Gefen & Carmel, 2013)
Number of assessed skills	NSR	No significant impact of the number of assessed skills was found	(Gefen & Carmel, 2013)
Marketplace preference label	Positive	Having the marketplace's preference label is positively associated with a provider's survival (i.e., regularly being selected by customers) in a crowdsourcing marketplace	(Banker et al., 2011)
Hourly rate	Positive	A provider's hourly rate is positively associated with customers' choices	(Hong & Pavlou, 2017)
Duration of professional experience (verified/unverified)	Positive	A longer duration of professional experience is positively associated with a provider's survival in a crowdsourcing marketplace	(Banker et al., 2011; Gefen et al., 2016)
	Non-significant	The duration of a provider's experience does not have a significant impact on customers' choices	(Banker & Hwang, 2008)
References (verified/unverified)	Positive	A larger number of references is positively associated with a provider's survival in a crowdsourcing marketplace	(Banker et al., 2011)
	Non-significant	A significant impact of having professional references on the decisions of customers to choose the respective provider was not found	(Banker & Hwang, 2008)

Table 8 - Antecedents of customers' choices – provider profile category

Relevant educational degrees (verified/unverified)	Non-significant	No significant impact of a relevant educational degree was found on a given provider's selection by customers	(Banker & Hwang, 2008)
Total/monthly earnings	Positive	Higher total earnings positively impact on customers' choices A provider's average monthly earnings over the past three months is positively associated with the provider's likelihood of being regularly selected by customers	(Banker & Hwang, 2008; Kanat et al., 2018)
Reputation status	Positive	A higher reputation status, more standardized service offering and membership in the dispute resolution program of the crowdsourcing marketplace positively impact on customers' choices	(Banker & Hwang, 2008; Kanat et al., 2018)
Professional certificates (verified/unverified)	Non-significant	No significant impact of a professional certificate was found on a given provider's survival or selection by customers in a crowdsourcing marketplace	(Banker & Hwang, 2008; Banker et al., 2011)
Number of won projects	Negative	The average number of projects won by a provider over the past three months is negatively associated with the provider's likelihood of regularly being selected by customers	(Kanat et al., 2018)
Number of completed projects	Positive	A larger number of completed projects positively impacts on customers' choices	(Hong & Pavlou, 2017; Kim, 2009; Zheng et al., 2015)
	Positive	A larger ratio of successfully completed projects to all projects and a larger average number of projects completed each month over the past three months, both have a significant, positive impact on the respective provider's survival in the long-term	(Kanat et al., 2018)
Portfolio	Positive	A larger ratio of technical projects in a provider's portfolio has a significant, positive impact on the respective provider's survival in the long-term	(Kanat et al., 2018)
Firm size (number of employees)	Negative	A larger firm size negatively impacts on customers' choices	(Kim, 2009)
Country of origin	NA	Customers prefer providers from their own country of origin, except for U.S. customers	(Gefen & Carmel, 2008, 2013; Liang et al., 2018)
	NA	U.S. customers prefer providers from the US	(Kim, 2009; Liang et al., 2018)
	Negative	Country differences between a customer and a provider (in terms of time zone and culture) have a negative impact on the customer's decision to choose the provider	(Hong & Pavlou, 2017)
	NA	Customers prefer providers from countries with inferior purchase power parities	(Gefen & Carmel, 2008; Gong et al., 2018)
	NA	Customers prefer provider from countries with a higher IT development index (in terms of IT infrastructure and access)	(Hong & Pavlou, 2017)

Table 8 - Antecedents of customers' choices – provider profile category

	NA	Providers from developing countries are more likely to be chosen by customers regularly and to survive in the long-term	(Kanat et al., 2018)
Speaking language	NA	Customers from English-speaking countries favor English-speaking providers	(Gefen & Carmel, 2008; Liang et al., 2018)
	NA	Language difference between a provider and a customer negatively impacts on the customer's decision to choose the provider	(Hong & Pavlou, 2017)

Average (weighted) Rating, Experience, and Membership

Among a wide range of information components that are available provider profiles, the average (weighted) rating has been more frequently studied by previous research (e.g., Banker & Hwang, 2008; Gefen & Carmel, 2013; Hong & Pavlou, 2017; Kim, 2009; Ögüt, 2013; Zheng et al., 2015). All these studies showed a significant impact of the average (weighted) rating on customers' choices. Most crowdsourcing marketplaces use the average value of a provider's ratings weighted by the corresponding project values rather than a simple average rating as the former reflects the overall performance of the provider more accurately.

In addition to the average weighted rating, previous studies showed that total earnings, reputation status (which shows how well a provider is committed to the crowdsourcing marketplace's professional standards), crowdsourcing marketplace experience, standardized service offering (in terms of the service description, hourly rate and delivery time) and membership in the dispute resolution program of the crowdsourcing marketplace significantly influence customers' choices (Banker & Hwang, 2008; Hong & Pavlou, 2017; Kanat et al., 2018; Zheng et al., 2015).

Banker et al. (2011) showed that a longer professional experience, a larger number of references, a higher average weighted rating and having the marketplace's preference label positively impact on the survival of the provider in the marketplace. A provider's survival is indeed associated with the decisions of customers to regularly choose the provider for their projects. However, Banker et al. (2011) did not find any significant impact related to the number of professional certificates.

Past Performance

Kanat et al. (2018) showed that a provider's average monthly earnings over the past three months, average monthly number of projects completed over the past three months, and ratio of technical projects in the portfolio are all positively associated with the provider's likelihood of survival in the long-term. However, they found a significant, negative association between a provider's average monthly number of projects won over the past three months and the provider's survival in a crowdsourcing marketplace. Kanat et al. (2018) argue that this negative association is potentially because providers with a higher average monthly number of projects won over the past three months are more successful, and thus leave the crowdsourcing marketplace for a conventional job. This argument, however, needs further evaluation to be confirmed, as many providers are regularly winning crowdsourcing auctions and stay active for a long time on crowdsourcing marketplaces.

Firm Size

According to previous research, a provider's firm size (in terms of the number of employees) has a negative impact on customers' choice (Kim, 2009). This negative impact is potentially because customers often have more bargaining power in relation to smaller providers and/or usually find transacting with larger providers costlier (because of more bureaucratic procedures) (Kim, 2009).

Feedback and Ratings

Previous research has found that the total number of feedback ratings on a provider's profile and the number of skill assessments passed by the provider do not impact on customers' choices significantly (Gefen & Carmel, 2013; Holthaus & Stock, 2017; Liang et al., 2018). However, having controlled for the impact of prior relationships between the two parties, Ögüt (2013) found the impact of the number of feedback ratings on a provider profile to be significant on customers' decisions to choose a provider.

Environmental Factors: Language, Culture and Country

Scholars have also studied the impact of differences between providers and customers, in terms of their environmental factors (e.g., speaking languages and countries of origin as an abstract indicator of cultural and financial differences), on customers' choices (Gefen & Carmel, 2008; Gong et al., 2018; Hong & Pavlou, 2017; Kanat et al., 2018; Liang et al., 2018).

For instance, Gefen and Carmel (2008) found that customers prefer crowdsourcing their projects to providers from their own country of origin, except for U.S. customers who prefer offshore outsourcing. While Gefen and Carmel (2013) confirmed this finding, Kim (2009) showed that U.S. customers also prefer providers from their own country. In a more in-depth investigation, Hong and Pavlou (2017) found that both cultural differences (based on the cultural distance between countries, estimated through the World Value Survey (Inglehart & Welzel, 2010) and time zone differences between a provider and a customer negatively impact on the customer's decision to choose the provider.

Gefen and Carmel (2008) found that customers who decide to crowdsource their projects to offshore destinations generally prefer using providers from countries with weaker economy to take advantage of labor arbitrage. In a similar vein, Kanat et al. (2018) found that providers from developing countries are more likely to survive on a crowdsourcing marketplace especially if they have a larger ratio of successfully completed projects. Contrarily, Hong and Pavlou (2017) found that being from a country with a superior IT development (measured by the World Economic Forum's Networked Readiness Index — NRI) has a positive impact on customers' decisions to choose a given provider. However, a provider's higher average rating decreases the positive impact of the provider's IT development index on customers' choices (Gong et al., 2018; Hong & Pavlou, 2017).

Language difference between a provider and a customer has also a significant influence on customer's decision. In general, Hong and Pavlou (2017) showed that the language difference negatively impacts on customers' choices. In particular, customers from English-speaking countries often prefer English-speaking providers (Gefen & Carmel, 2008). Hong and Pavlou (2017) found that a provider's high average rating mitigates the negative impact of the provider's language and cultural differences on customers' decisions to choose the provider. However, a high average rating does not moderate the negative impact of an existing time zone difference between the two parties.

Customer Characteristics

Finally, the literature on crowdsourcing marketplaces has found that a customer's characteristics can also impact the customer's choice decision (Zheng et al., 2015). More specifically, Zheng et al. (2015) found that a customer's experience in a crowdsourcing marketplace, in terms of the number of crowdsourced projects, is negatively associated with the customer's decision to choose a provider in their auctions. This result indicates that more experienced customers are less likely to crowdsource their projects in auctions, as they are potentially more conservative due to prior unsuccessful experiences. This rather a surprising finding that needs further evaluation, as the random effects models in the same study, which account for customers' heterogeneity, found this association to be significant and positive. Table 9 summarizes the main findings of the literature on the impact of customer characteristics on their choices.

Table 9 - Antecedents of customers' choices – customer characteristics category			
<i>Antecedent</i>	<i>Impact</i>	<i>Findings</i>	<i>Supporting References</i>
Marketplace experience (total number of crowdsourced projects)	Negative	A customer's experience in a crowdsourcing marketplace (in terms of the number of crowdsourced projects) has a significant negative impact on the customer's transacting decision	(Zheng et al., 2015)

Discussion and Conclusions

As discussed in the preceding sections, CMs have attracted the attention of many scholars over the past decade. However, these marketplaces are yet underexplored compared to their traditional counterparts (Gefen et al., 2016). Generally, the literature on crowdsourcing marketplaces has mainly focused on the technical and economic aspects of these marketplaces (Alt & Klein, 2011) and overlooked other important aspects, such as customer-provider relationship development, its antecedents and outcomes (Alt & Klein, 2011; Kim & Wulf, 2009). More specifically, the process of selecting a provider by customers, the factors affecting providers' business success, and the impact of providers' profile information on both customers' choices and the providers' success are not well explored. This section summarizes major insights from the review of relevant literature presented in the previous section.

Customers' Choices in Crowdsourcing Marketplaces

Major determinants of customers' choices in CMs studied by previous research can be classified into: a) prior relationship, b) provider bidding behavior, c) CM and auction characteristics, d) provider profile information, and e) customer characteristics. Relevant literature findings, summarized in Section 4, are usually consistent and well justified, both theoretically and practically. However, there are still several avenues which need further investigation, as discussed next.

The literature has found a significant impact of prior relationship with a provider on a given customer's decision to choose the provider. However, such an impact is complex as several studies have shown that exchange relationships between customers and providers can significantly vary in terms of "share of transactions with their most preferred provider", "total length of relationships with their most preferred provider", "ratio of open auctions to private invitations as their exchange method", "average value of crowdsourced projects" and "average length of crowdsourced projects". Further research is needed to better understand the impact of such factors on customers' choices for outsourcing services of different types, sizes and complexities.

The literature has also shown that a provider's bidding behavior, in terms of proposed delivery time, price and bidding time can significantly influence customers' choices. Ögüt (2013) has found that the (relative) proposed delivery time has a significant impact only for low-value projects. Furthermore, Gefen and Carmel (2008) have found that a higher ratio of a provider's bid price to either the "winning" or the "average bid price" in an auction has a negative impact on the decision of the respective customer to choose the provider. Gefen and Carmel (2013) have shown that a higher price premium (i.e., the difference between the bid price and the "average bid price" in an auction divided by the "standard deviation of all bids" in the auction) has a negative impact on the customer's choice decision. Contrary to these findings, Gefen and Carmel (2013) could not find any significant direct effect of bid price on customers' decisions. These findings provide empirical support for a significantly higher complexity of customers' choices on CMs compared to other types of EMs, where the price is often the most important factor.

CM and auction characteristics can also impact on customers' choices. Such an impact is often more complex compared to other types of EMs and needs further investigation to reveal the associated complexities. For example, receiving a large number of bids from many providers seems to negatively influence the decision of the respective customer to crowdsource the project, potentially due to the cost and complexity of choosing the best provider among all bidders (Snir & Hitt, 2003; Zheng et al., 2015). This is not in line with the findings for other types of EMs (e.g., EM for goods) in which large number of bids often enhances the competition among bidders and results in better offers for the customer.

Provider profile information is the most studied factor that influences customers' choices on CMs. Several profile information components, however, have been found to have complex and surprising effects. Kim (2009), for example, has found a negative impact of a provider's firm size (in terms of the number of employees) on customers' choices. While this finding can be attributed to the bargaining power of a customer over smaller providers, it needs further investigation, especially considering a potential direct relationship between firm size and trustworthiness (Ba & Pavlou, 2002; Kim, 2009; Pavlou & Dimoka, 2006).

Country and associated cultural/linguistic differences between customers and providers are among the most complex determinants of customers' choices studied by previous research. For example, Hong and Pavlou (2017) have found that a provider's high average rating mitigates the negative effect of language and cultural differences between transacting parties, even though it does not moderate the negative impact of time zone differences. Another interesting finding is that providers from developing countries are more likely to survive on a CM (Kanat et al., 2018). Such complex effects need to be further investigated for different types of services, especially considering potential moderating effects of other factors, such as prior relationship between parties.

Furthermore, the majority of previous research on the impact of descriptive, textual profile information components on customers' choices has considered simple and superficial aspects of these information components (e.g., word counts) by quantifying them for the analysis. However, such information components usually communicate stronger signals compared to their numerical counterparts. Thus, a more in-depth evaluation of different aspects of these information components using content/sentiment analysis can reveal the underpinning processes through which these components impact on customers' choice. Several studies on EMs for goods have investigated some aspects of these information components (e.g., Pavlou & Dimoka, 2006) but the literature on crowdsourcing marketplaces lacks such in-depth investigation.

Finally, customer characteristics have been shown to influence customers' choices on CMs. One surprising finding is that more experienced customers are less likely to crowdsource their projects in their auctions. As discussed in the previous section, these customers are potentially

more conservative due to prior unsuccessful experiences. However, a more in-depth investigation is required to reveal differences in the decision-making process of less versus more experienced customers and potential factors underlying such differences.

Role of Provider Profiles

As summarized in Section 4, the literature has shown that the information (especially feedback information) on provider profiles reduces the information asymmetry between providers and customers (Hong & Pavlou, 2012; Pavlou & Dimoka, 2006; Zhang et al., 2016). Feedback information components help developing trust among transacting parties in EMs, including crowdsourcing marketplaces (Hong & Pavlou, 2012; Lee & Koo, 2012). The existence of feedback mechanisms prevent potential opportunistic behavior of online providers because such behavior would become permanently visible on the providers' profiles (Pavlou et al., 2007) and damage the providers' gradually established reputation (Ba & Pavlou, 2002; Pavlou & Dimoka, 2006).

Given a wide range of information components that are usually available on provider profiles, the impact of these profiles on customers' decision-making is usually complex. Provider profiles' information is used by customers to assess the required technical and functional quality of providers, which are totally irrelevant on EMs for goods (Hong & Pavlou, 2017). Each individual profile information component has a potentially distinctive impact on the choice decisions of customers while at the same time it may also confirm, contradict, or complement other information components. For example, as shown by Moreno and Terwiesch (2014), more certificates on a provider's profile mitigate an adverse impact of the provider's negative ratings on customers' decisions to choose the provider.

Furthermore, each provider on a crowdsourcing marketplace often offers a wide range of heterogeneous services (e.g., web development, user interface design and desktop application programming) which contribute to the complex effects of their profile on customers' decision-making. This is because customers may consider different combinations of a provider's profile information components to be relevant for their decision-making, based on the type of services which they tend to crowdsource to the provider (Kokkodis & Ipeiritis, 2016). Good performance measures in the past do not necessarily mean that a given provider can perform well for a totally different and customized service in the future. This is contrary to EMs for goods where the relevance of product reviews as well as seller reputation indices remains consistent and rather unchanged over time (Lin et al., 2018).

The extensive amount of information usually available on provider profiles (that should be evaluated by customers when choosing a provider) causes a significant information overload problem inherent to crowdsourcing marketplaces (Li, 2017). Li (2017) showed that online reputation information has multiple attributes (e.g., complexity, ambiguity and diversity) which significantly impact on potential customers' perceptions of information overload. The reputation information on provider profiles is often much more complex (i.e., comprises of many components), ambiguous (i.e., can be interpreted in many ways) and diverse (i.e., originates from many different sources) on crowdsourcing marketplaces, compared to EMs for goods. These characteristics of provider profiles' information on crowdsourcing marketplaces cause different types of impact on customers' choices (Holthaus & Stock, 2018).

Finally, on crowdsourcing marketplaces, reputation is not simply the only mean for pricing, as is often the case in EMs for goods (Archak et al., 2011; Liu et al., 2012; Moreno & Terwiesch, 2014; Pavlou & Dimoka, 2006). The behavioral response of customers to providers' reputation information is often very complex on crowdsourcing marketplaces (Moreno & Terwiesch, 2014).

Based on these findings from the literature, we can now have a better understanding of factors that impact the selection of a provider in crowdsourcing marketplaces (i.e., who actually gets the job). Our literature analysis illustrates we can address this question from two perspectives: from i) customer perspective and ii) provider perspective.

From the customers' perspective, they usually select a provider who has a well-known reputation in the market, a provider's reputation generally plays a more significant role when they did not have a prior relationship. When there is a relationship between customers and providers, a combination of following factors help customer to make a decision: "share of transactions with their most preferred provider", "total length of relationships with their most preferred provider", "ratio of open auctions to private invitations as their exchange method", "average value of crowdsourced projects" and "average length of crowdsourced projects".

From the providers' perspective, one of the main elements that usually customers use to select a provider is considering providers' profile information. This includes both numerical and descriptive information. Providers are advised to add more certificates, customers' feedback on their profile. This information can reduce asymmetry and in turn develop trust among customers. Thus, providers might find it helpful to strengthen their profile by improving different aspects because customers may consider different combinations of a provider's profile information components to be relevant for their decision-making.

Similarities and Differences Between CMs and Other EMs

The findings of literature on CMs have similarities with the findings of the broader literature on EMs, although several differences have also been highlighted by the literature. For example, the broader literature on EMs as well as the literature on crowdsourcing marketplaces have both shown that the information on provider profiles impacts on customers' transaction decisions. Through highlighting a provider's competence and overall success, such information is an important determinant of the provider's trustworthiness (Banker & Hwang, 2008; Clemons et al., 2016; Gefen & Carmel, 2013; Holthaus & Stock, 2017; Hong & Pavlou, 2012). Third-party verifications of such information can also enhance the perceived trustworthiness of the corresponding provider (Holthaus & Stock, 2017; Hu et al., 2010). A provider's trustworthiness in turn has a direct impact on customers' transaction decisions, and thus the number of customers who transact with the provider (W. Guo et al., 2017). Customers consider transacting with a more trustworthy provider to be less risky, and hence they are more willing to transact with such a provider (Gefen & Carmel, 2010; Kim et al., 2009; Palvia, 2009; Wang & Chiang, 2009).

However, previous research on EMs for goods has shown a significant impact of online reviews' content and verbal style on customers' decision-making (Ludwig et al., 2013). By contrast, the literature on CMs does not provide an accurate image of the impact of provider profiles' textual information components on customers' decision-making.

Overall, the findings of this research on customer choice decisions in CMs can be extended/generalized to other similar contexts, including other crowdsourcing marketplaces in particular, and EMs for goods (with appropriate adjustments) in general.

Literature Gaps and Research Outlook

The literature has investigated the impact of provider profile information components on customers' choices, among which feedback information is more important (e.g., self-descriptions of providers) (Gutt & Kundisch, 2016; Zhang et al., 2016). This is so because feedback information components reflect the genuine and de facto experience of past customers (Chen & Tseng, 2011). Overall, among the information on a provider's profile, the literature has established that feedback information is an effective means to build and

represent the reputation and trustworthiness of providers (Duan et al., 2008; Gefen & Carmel, 2010; Gefen et al., 2003; Pavlou & Dimoka, 2006; Qu et al., 2008). Hence, all EMs including crowdsourcing marketplaces encourage customers to leave feedback after each transaction with a provider (Dellarocas, 2003; Dellarocas, 2005). Accordingly, a large body of the literature on EMs in general, and crowdsourcing marketplaces in particular, has focused on the impact of feedback information on customers' choice decisions.

Given the importance of provider profiles' feedback information, Table 10 recaps the findings and gaps of the literature specifically those focused on the impact of online feedback information on crowdsourcing marketplaces and also adds major relevant findings of the literature on EMs. As explained above, the literature appears to agree that across contexts, the "average rating" (average rating based on all past customer ratings) is a key information component. A high average rating positively affects the decisions of customers to transact with the corresponding provider (Kim, 2009; Lin et al., 2018; Snir & Hitt, 2003; Zheng et al., 2015). A high average rating also positively correlates with the likelihood of the provider actually being paid by their customers (Gefen & Carmel, 2010).

Table 10 - Literature findings and gaps on feedback information

Component	Studies	Findings	Gaps
Number of reviews	Kim (2009), Gefen and Carmel (2010), Duan et al. (2008)	A higher number of feedback reviews is positively associated with a higher likelihood that the respective provider is selected by customers.	Impact of the number of reviews in relation to other information components is underexplored (i.e., relative strength of effect and interaction effects).
Average (weighted) rating	Kim (2009), Gefen and Carmel (2010), Qu et al. (2008), Hong and Pavlou (2012), Banker and Hwang (2008)	A high average rating on a provider profile positively impacts on the decisions of customers to transact with the provider.	Crowdsourcing marketplaces usually present an average <i>weighted</i> rating on each profile instead of a simple arithmetic average rating like other EMs. In fact, the average weighted rating does not simply reflect the values of individual ratings, as the average is weighted by the respective project values, which are hidden from customers. The impact of this component especially in relation to other components is underexplored.
Positive ratings (absolute number or relative number in relation to negative/neutral ratings)	Duan et al. (2008), Pavlou and Dimoka (2006), Ba and Pavlou (2002)	The total number of positive ratings is positively associated with the perceived trustworthiness of the respective provider.	Impact of the number of positive ratings in relation to other feedback components is underexplored (i.e., relative strength of effect and interaction effects). It is not clear if the effect of the absolute number changes based on the presence of negative ratings (i.e., are there different effects?). Ratings are often displayed on multiple feedback pages — the role of their visibility is rather unknown.

Table 10 - Literature findings and gaps on feedback information

Positive and negative comments (absolute number or relative number)	Li and Hitt (2008), Dellarocas (2003), Lee et al. (2008), Pavlou and Dimoka (2006), Lee and Koo (2012)	Individual positive or negative comments are associated with product sales. The age of the comments has a direct impact on their effectiveness. The credibility of negative comments is higher than the credibility of positive comments.	Impact of the number of positive or negative comments in relation to other information components is underexplored (i.e., relative strength of effect and interaction effects). It is not clear if the effect of the absolute number of positive comments changes based on the presence of negative comments (i.e., are there different effects?). Comments are often displayed on multiple feedback pages — the role of their visibility is rather unknown.
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The literature further suggests that the “number of reviews” is relevant in EMs (Duan et al., 2008; Gefen & Carmel, 2010; Kim, 2009). While these findings are related to the transaction behavior of customers in the context of marketplaces for products, it appears reasonable to assume that the same underlying logic (that customers are more likely to select providers that have been selected more frequently by previous customers) also may apply to crowdsourcing marketplaces. Other feedback information components also may be important for customers’ decision-making. While not investigated in the context of crowdsourcing marketplaces, the literature on EMs for goods found that the number of “positive ratings” and the number of “positive comments” can affect customers’ transacting behavior (Ba & Pavlou, 2002; Pavlou & Dimoka, 2006).

Overall, the relevant literature findings show that we are lacking knowledge about the following items:

1. We do not clearly know the impact of feedback information components (except for average rating) on “customers’ choices,” as previous studies have evaluated the impact of these components on customers’ trust, price premiums and bid prices rather than choices.
2. We do not know the role of implicit characteristics of feedback information components in customers’ decision-making (for example, we do not know to what extent the visibility of information components matters).
3. We do not know if and how each information component can influence on the effect of other information components on providers’ success (for example, are there dominant effects? Are there moderating effects?). We cannot answer these questions solely based on the literature.

Thus, based on the review of the crowdsourcing marketplace literature presented in this study, the major gaps of the literature on customers’ choices in crowdsourcing marketplaces can be summarized as follows.

1. The literature on crowdsourcing marketplaces lacks a comprehensive understanding of the provider selection process by customers as well as antecedents and outcomes of this process. The literature has mainly examined crowdsourcing transactions and their outcomes from the perspectives of trust development and price premiums paid by customers as well as providers’ bidding behavior and prices. More specifically, the literature lacks knowledge on the impact of providers’ profile information including previous customers’ feedback — as an important determinant of the customer–provider relationship development — on “customers’ choices.”

2. The relative importance of feedback information components in determining customers' choices has not been explored well. Except for average rating, we do not know if there are dominant effects for some feedback information components.
3. The role of implicit characteristics of feedback information components in determining customers' choices is underexplored. Previous studies have often examined the impact of a limited set of profile information components by focusing on a specific characteristic of the signals transmitted by these information components (Banker & Hwang, 2008; Connelly et al., 2011; Holthaus & Stock, 2017; Hong & Pavlou, 2012).
4. It is not clear if and how different feedback information components moderate the effects of each other on customers' choices.

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