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Input control and its signalling effects for complementors' intention to join digital platforms

Martin Adam[1] | Evgheni Croitor[1] | Dominick Werner[1] | Alexander Benlian[1] | Martin Wiener[2]

[1]Information Systems and E-Services, Technical University of Darmstadt, Darmstadt, Germany

[2]Chair of Business Information Systems, esp. Business Engineering, TU Dresden, Dresden, Germany

Correspondence
Martin Adam, Information Systems and E-Services, Technical University of Darmstadt, Darmstadt, Germany.
Email: adam@ise.tu-darmstadt.de

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Abstract

Existing information systems (IS) research on platform control has largely focused on examining how input control (i.e., the mechanisms used to control platform access) affects complementors' intentions and behaviours *after* their decision to join a digital platform. Yet, our understanding of how input control is perceived *before* this decision and how such perceptions influence prospective complementors' intention to join a platform is still nascent. In this regard, our study views input control as a salient signal that shapes prospective complementors' expected benefits and costs (i.e., their performance and effort expectancy), and ultimately their decision to join a digital platform. Drawing on signalling theory and the antecedent-benefit-cost (ABC) framework, we conducted a randomized online experiment in the context of donation-based crowdfunding. The experiment results offer empirical support for this view by showing that input control has distinct and complex signalling effects for prospective complementors. In particular, our findings reveal curvilinear and competing signalling effects, with perceived input control increasing both performance expectancy (at a decreasing rate) and effort expectancy (at an increasing rate). Also, we find that performance

expectancy linearly increases prospective complementors' intention to join a platform, whereas effort expectancy linearly decreases their intention to do so. These findings imply that the overall relationship between perceived input control and intention to join follows an inverted U-shape curve, which means that neither a low nor a high, but a moderate degree of perceived input control maximizes prospective complementors' intention to join. In sum, the results of our study provide novel and important insights into the signalling role that perceived input control plays in shaping prospective complementors' decision to join a digital platform.

KEYWORDS
digital platforms, effort expectancy, intention to join, perceived input control, performance expectancy, signalling

1 | INTRODUCTION

The success of digital platforms hinges heavily on complementors (e.g., developers, entrepreneurs) and their complements (e.g., mobile apps, crowdfunding campaigns) (e.g., Benlian et al., 2015; Huang et al., 2017; Thies et al., 2016). This suggests that platform providers failing to attract a continuous supply of new complementors are likely to struggle to sustain the growth and prosperity of their platform, and may eventually witness its collapse (e.g., Foerderer et al., 2018; Nikou et al., 2014; Ondrus et al., 2015; Parker et al., 2017; Tiwana, 2015b). Convincing new complementors to join has thus been described as one of the most crucial tasks for platform providers (e.g., Boudreau, 2012; Kathuria et al., 2020; O'Mahony & Karp, 2022).

When contemplating to join a platform, prospective complementors typically cannot resort to first-hand insights into the inner workings of the platform and thus tend to rely on weighing expected benefits and costs based on an assessment of the information 'signals' they receive from the platform (cf. Huang et al., 2013; Kude et al., 2012). While prior literature on intentions to join a platform has focused mainly on prospective users, studies have largely neglected prospective complementors (cf. Chen et al., 2022; Kathuria et al., 2020; Kretschmer et al., 2022). As such, research on the factors that influence prospective complementors' intention to join is still sparse. Here, the few existing studies indicate, at least implicitly, that prospective complementors factor various potential benefits and costs into their calculus to determine whether or not to join a platform (e.g., Huang et al., 2013; Parker & Van Alstyne, 2005; Tiwana, 2015b) and focus on the role of, for example, monetary incentives (e.g., discounted platform access, subsidized product development) (e.g., McIntyre & Srinivasan, 2017), marketing activities (e.g., sponsored conferences, marketing campaigns) (e.g., Boudreau & Jeppesen, 2015), as well as technological interventions (e.g., customizable platform features, complementary tools) (e.g., Gawer & Cusumano, 2014). Yet, the role of input control has been widely neglected, despite being a potentially important signal for prospective complementors' intention to join a platform.

Indeed, one of the first and most salient signals that prospective complementors perceive are arguably the requirements they must fulfil to be granted access to a digital platform. To specify such requirements, platform providers enact input control (e.g., Croitor & Benlian, 2019; Thies et al., 2018; Wessel et al., 2017), which can be described as the set of gatekeeping mechanisms used to screen and sort out new complementors and their complements (Croitor & Benlian, 2019). Here, information systems (IS) scholars have pointed to the importance of input

control as a critical governance tool for aligning the interests of platform providers and complementors, as well as for avoiding negative long-term effects (e.g., Boudreau, 2012; Thies et al., 2018; Tiwana, 2015a). In this regard, the use of input control is indicative of whether a platform provider wants to adopt a laissez-faire approach based on market mechanisms and the 'wisdom of the crowds', or a rigorous gatekeeping approach in which the provider itself screens and selects for high quality.

Consider the example of donation-based crowdfunding platforms (e.g., Globalgiving.org and Betterplace.org), which intend to democratize charitable giving by enabling the participation of the highest possible number of complementors (i.e., campaign organizers) and users (i.e., donators) on digital platforms. However, in this example, uncontrolled participation may open the door to exploitation and misuse, thereby increasing the risk of detrimental outcomes for both platform users (e.g., fraud, non-delivery) and providers (e.g., legal complaints, loss in trust and legitimacy). Hence, donation-based crowdfunding platforms usually employ rigorous input control procedures, such as requiring campaign organizers to submit a government-issued certificate in order to verify their official status as a charitable organization. In light of the inherent tension between desired platform inclusiveness and required platform selectivity (e.g., Kim & Hann, 2019; Mollick & Robb, 2016), examining the attraction versus deterrence effects of input control for prospective complementors represents a theoretically intriguing and practically important research endeavour.

While the critical role of input control in terms of platform openness has already been well documented in existing literature on platform control—including the importance of finding the 'right' balance between openness (i.e., market regulation) and control (i.e., platform regulation), along with the related effects on revenues and user participation (e.g., Benlian et al., 2015; Thies et al., 2018; Wessel et al., 2017)—our review of this literature uncovered two issues that are still underexplored and thus particularly noteworthy (please see Table A1 for a summary of our review results). First, in previous literature, input control is primarily viewed as a governing mechanism, whereas the anticipatory nature of input control, and especially the signalling role that it plays in platform ecosystems, has been largely neglected. Accounting for the signalling function of input control is important, as it entails a shift in research focus from *post*-entry implications of input control for platform complementors (e.g., continuance intentions) to *pre*-entry implications for prospective complementors (e.g., intention to join a platform). This shift in focus is theoretically intriguing as it paves the way for a more explicit investigation of widely neglected platform signals, such as input control, and their effects on prospective complementors' expectations regarding the benefits and costs associated with joining a digital platform (e.g., Chen et al., 2022; Kathuria et al., 2020; Kretschmer et al., 2022). Moreover, it may help explain negative downstream consequences for platform growth and sustainability resulting from a potential mismatch between (prospective) complementors' expectations and the signals they receive from the platform provider.

Second, existing research rests on the implicit assumption that the relationships between (input) control and complementors' intentions and behaviours are linear (and thus rather simplistic). For instance, on the one hand, several studies find that complementors' interest in a platform dwindles with increasingly strict control, especially in the case of input control (e.g., Croitor et al., 2020, 2021; Thies et al., 2018). On the other hand, studies on the performance of complements indicate that complementors may perceive too little control as negative (e.g., Tiwana, 2015a; Wessel et al., 2017; Zhang et al., 2020). These mixed and somewhat inconclusive findings raise the question of whether prior studies only scratch the surface of what are in fact much more complex (i.e., non-linear) relationships between input control and complementors' intentions and behaviours. In this context, we argue that input control provides a salient information signal to prospective complementors in relation to their expected benefits (e.g., high returns due to strict quality control) and costs (e.g., the efforts involved in getting and maintaining platform access). Consequently, our study explicitly considers the competitive mediating effects of prospective complementors' performance expectancy (i.e., expected benefits) and effort expectancy (i.e., expected costs), which represent key predictors of behavioural intentions (e.g., Venkatesh et al., 2003, 2012). This is important because it enables us to uncover the complex chain of relationships between prospective complementors' perceived input control and their intention to join a platform, which in turn also allows conclusions about the overall relationship between the two. On this basis, our study sets forth to examine the following research question (RQ): *How does prospective*

complementors' perceived input control affect their performance expectancy and effort expectancy, and ultimately their intention to join a digital platform?

To address our RQ, we draw on signalling theory (Spence, 1973, 1974) and the antecedent-benefit-cost (ABC) framework (Busse et al., 2016). Based on our theorizing, we conducted a randomized online experiment with 264 participants in the context of donation-based crowdfunding. This platform context is well suited for the purpose of our study due to its broad range of enacted input control practises and its vulnerability to the consequences of insufficient input control (e.g., fraud). In our experiment, prospective complementors reviewed a charity crowdfunding platform with three manipulated levels of input control (low, moderate and high) and expressed their intention to join this platform. The experiment results empirically support that input control has distinct and complex signalling effects for prospective complementors. More specifically, as hypothesized, we find curvilinear relationships between perceived input control and performance expectancy (*concave*-shaped) and effort expectancy (*convex*-shaped). Furthermore, we find that performance expectancy (effort expectancy) linearly increases (decreases) intention to join. Taken together, our results point to an inverted U-shaped relationship between perceived input control and intention to join, which suggests that a moderate level of input control is most effective in increasing prospective complementors' intention to join a digital platform.

Against this backdrop, our study contributes to the platform literature in two important ways: First, we advance our understanding of input control by highlighting its signalling function for prospective complementors, which unfolds its effects *before* complementors decide to join a digital platform (*a pre-entry perspective*), going above and beyond the conventional treatment of input control as a governing function *after* their decision to do so (*a post-entry perspective*). Second, we show that the relationship between input control and complementors' behavioural intention to join a platform is more complex than previously assumed. In particular, our study offers empirical support for linear, curvilinear, and competitive effects that help explain the overall inverted U-shaped relationship between prospective complementors' perceptions of input control and their intention to join. As such, we shed light on the underlying calculus regarding the expected benefits and costs of joining a digital platform and uncover a turning point that maximizes prospective complementors' intention to join. Furthermore, from a managerial viewpoint, our results offer platform providers actionable guidance on how to use input control to signal entry barriers that can help separate 'good' from 'bad' complementors, ultimately promoting healthy platform growth.

2 | THEORETICAL BACKGROUND

2.1 | Digital platforms, platform control and intention to join

In the IS and strategic management literature, digital platforms are defined and conceptualized as infrastructures that mediate interactions between complementors and users (e.g., Eisenmann et al., 2011; Foerderer et al., 2018; McIntyre & Srinivasan, 2017). Users are individuals or organizations that access complements available on the digital platform (Parker et al., 2017), whereas complementors are external third parties that provide such complements to the platform, but are not directly related to the platform provider (Wiener et al., 2020). For example, in the case of *GlobalGiving*, complementors are actors that publish charity campaigns (on behalf of their organization); in the case of *Airbnb*, complementors are hosts that offer accommodations; in the case of *Android*, complementors are application developers that publish apps, and so on. In this context, platform providers develop, design and govern their digital platform and, in doing so, manage the interactions between complementors and users (e.g., Eisenmann et al., 2011; McIntyre & Srinivasan, 2017).

To steer activities on digital platforms, platform providers engage in platform governance, which refers to central decisions with respect to ownership, decision rights and control on digital platforms (e.g., Gawer & Cusumano, 2014; Song et al., 2018; Tiwana et al., 2010). Control on digital platforms hereby comprises means through which platform providers ensure that both complementors and complements further the overarching interests of the digital platform

(e.g., Croitor et al., 2020; Tiwana, 2015a; Wessel et al., 2017; Wiener et al., 2019). IS control research commonly distinguishes between two types of control, namely formal and informal control (e.g., Kirsch, 1997; Ouchi, 1979; Wiener et al., 2016). While formal control (i.e., input, behaviour and output control) is enacted through means of specification and evaluation (Cardinal, 2001; Cardinal et al., 2004), informal control (i.e., clan and self-control) is invoked socially through norms and values mutually shared by individuals or groups (Wiener et al., 2016). The focus of the study at hand lies on (formal) input control, which refers to digital platform providers' use of gatekeeping and screening procedures to determine which complementors (and complements) are granted platform access (Croitor & Benlian, 2019). Our study's focus on this control mode addresses a key shortcoming in prior IS control research, which has mainly focused on the effects of behaviour, output, clan and self-control (Wiener et al., 2016), thereby neglecting the increasing relevance of input control, which is particularly true for platforms contexts (e.g., Saunders et al., 2020; Thies et al., 2018).

Existing IS research has largely treated input control as a critical governance tool for aligning the interests of platform providers and complementors, with a particular focus on mitigating the negative downstream consequences (e.g., diminishing quality of complements) that result from complementors competing and vying for limited user attention and resources (e.g., Boudreau, 2012; Thies et al., 2018; Tiwana, 2015a). Yet, besides its governance function to steer the behaviours of complementors who have already joined a digital platform, input control can also motivate prospective complementors to join, thereby ensuring a platform's long-term growth and survival (e.g., Boudreau & Jeppesen, 2015; Kathuria et al., 2020; O'Mahony & Karp, 2022). Here, we argue that perceptions of input control are likely to play a decisive signalling role in influencing prospective complementors' intention to join a digital platform. This is because the degree of input control is arguably one of the first signals that prospective complementors will perceive; and also, because it carries relevant information that will shape their calculus of expected benefits and costs prior to joining a platform. Yet, research focusing on prospective complementors is rather nascent and has largely overlooked the signalling function of input control (e.g., Chen et al., 2022; Kathuria et al., 2020; Kretschmer et al., 2022). Indeed, extant studies have only begun to look into prospective complementors' calculus, focusing mainly on 'objective' benefits and costs that they can anticipate from joining a platform, such as monetary incentives (e.g., discounted platform access, subsidized product development, access to valuable resources) (e.g., Kude et al., 2012; McIntyre & Srinivasan, 2017), marketing activities (e.g., sponsored conferences, marketing campaigns) (e.g., Boudreau & Jeppesen, 2015) and technological interventions (e.g., customizable platform features, complementary tools) (e.g., Gawer & Cusumano, 2014). As such, our understanding of how prospective complementors make sense of input control—as reflected by their expectations toward a platform, and ultimately, their intention to join this platform—is limited at best.

2.2 | Signalling theory

To examine the distinct signalling effects of perceived input control on prospective complementors' intention to join a digital platform, we draw on signalling theory (Spence, 1973, 1974), which has been used extensively in the management literature (e.g., Lester et al., 2006; Zhang & Wiersema, 2009) and increasingly found its way into the IS literature (e.g., Dimoka et al., 2012; Lansing et al., 2019; Lowry et al., 2012). Broadly speaking, signalling theory is useful for studying behaviours, or behavioural intentions, when the relationship between two parties (e.g., a platform provider and a prospective complementor) is characterized by information asymmetries. Here, individuals seek informational cues that allow them to form expectations about the benefits and costs of their counterpart's offering; that is, while one party (platform provider) provides information (signal), the other party (prospective complementor) perceives, interprets, and evaluates this information.

Due to its explicit recognition of signals as informational cues that enable individuals to make subjective assessments about expected benefits (i.e., performance expectancy) and expected costs (i.e., effort expectancy), signalling theory lends itself to being a useful overarching theoretical lens to examine input control as a signal that shapes

prospective complementors' intention to join a digital platform. Specifically, signalling theory offers a parsimonious and theoretically grounded way to capture countervailing expectations (i.e., benefits vs. costs) derived from informational cues embedded in a signal (input control). It thus provides an adequate theoretical scaffolding for studying the distinct signalling effects of perceived input control on prospective complementors' performance and effort expectancy, both of which have been acknowledged as key predictors of behavioural intentions in prior IS research (e.g., Venkatesh et al., 2003, 2012).

3 | HYPOTHESES DEVELOPMENT

To develop our hypotheses regarding the distinct signalling effects of perceived input control on prospective complementors' performance and effort expectancy, and ultimately on their intention to join a digital platform, we integrate signalling theory with the ABC framework (Busse et al., 2016). Although signalling theory can help explain how signals (i.e., input control) influence perceivers (i.e., prospective complementors), it lacks an underlying framework of how perceivers aggregate various interpretations from one and the same signal into a meaningful whole (i.e., intention to join a platform) (Connelly et al., 2011). In this regard, the ABC framework provides a lens to understand complementors' behavioural intentions as a trade-off evaluation (i.e., calculus) of expected benefits and costs associated with joining a given digital platform. The cost–benefit duality that characterizes the ABC framework can be seen as a special case of competitive mediation, where a dependent variable is influenced by two mediators with opposing effects (i.e., benefits vs. costs) (Zhao et al., 2010). Generally, benefits are positive outcomes that result from an action and thus serve as motivators for human behaviour (e.g., quality, revenue), whereas costs are resources that are required for an action (e.g., money, effort, time, knowledge) and therefore act as deterrents for human behaviour (Kankanhalli et al., 2005). Complementors can be expected to join a platform only after careful deliberation because stakes are high with respect to potential benefits (once their offerings are presented to a sizeable group of users) and with respect to potential costs (e.g., the efforts involved in getting access to a platform and continuously attracting users' attention on this platform). Because it is built on a cost–benefit trade-off at its core, the ABC framework is well suited as a guiding lens to examine prospective complementors' calculus underpinning their decision to join a digital platform.

In our research model (see Figure 1), we conceptualize perceived input control as the main antecedent, performance expectancy as the benefit, effort expectancy as the cost and intention to join as the outcome. As indicated, besides the 'overall' (direct) effect of perceived input control on intention to join (H5), our model includes two competing indirect effects: a positive indirect effect via performance expectancy (H3) and a negative indirect effect via effort expectancy (H4).

3.1 | The signalling effect of input control on performance expectancy

According to signalling theory, a signaller undertakes actions to signal benefits of an offering (e.g., high quality) to a receiver. The receiver then perceives and interprets the signal and may then form beneficial expectations regarding the signaller's offering (depending on the perceived benefits she or he infers from the signal). Applied to the context of digital platforms, we argue that platform providers utilize input control as a powerful signal for conveying performance-related benefits of their platform to prospective complementors (e.g., exclusive circle of high-quality complementors, above-average revenues). In particular, if prospective complementors perceive that a given digital platform enacts high levels of input control (i.e., many and strict vetting practises), they are more likely to associate this platform with a high overall quality of complementors and complements. This in turn can be expected to attract a large user base that is actively and regularly engaging with the platform and seriously interested in its offerings, leading prospective complementors to anticipate high benefits of joining the platform (e.g., Hukal et al., 2020;

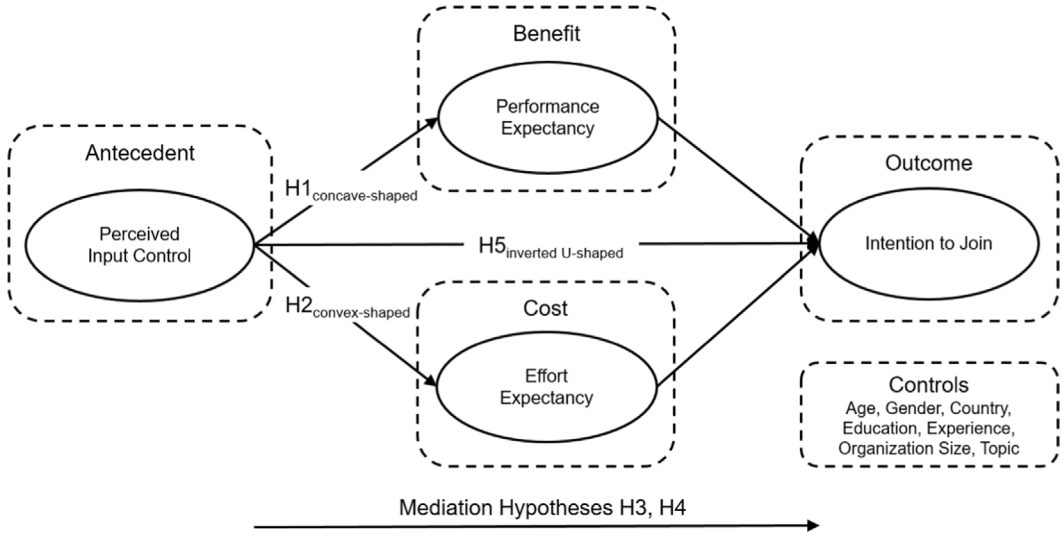

FIGURE 1 Research model

Wessel et al., 2015). In contrast, if prospective complementors perceive that a digital platform enacts only low levels of input control (i.e., few and relaxed vetting practices), they are likely to associate this platform with a lower overall quality and thus also with lower engagement levels by users, curbing their anticipated benefits of joining the platform.

Although the arguments presented so far point to a positive and linear relationship between perceived input control and performance expectancy, we argue that the form of this relationship is actually more complex and nuanced. More specifically, we assume that the generally positive relationship weakens at heightened levels of perceived input control (i.e., once a certain level of expected performance benefits has been reached). In other words, we posit that the utility of the benefits-signalling effect of input control declines gradually; that is, that the marginal increase in prospective complementors' performance expectancy diminishes with each incremental gain in perceived input control (see Figure 2a). This assertion finds support in related IS research, which suggests that benefits-signalling effects emanating from the same signal tend to saturate at higher levels (e.g., Liang et al., 2019; Liu & Goodhue, 2012). On this basis, we propose:

> **H1.** *As perceived input control increases, performance expectancy increases at a decreasing rate (i.e., concave-shaped relationship).*

3.2 | The signalling effect of input control on effort expectancy

In line with signalling theory, a signal may not only carry information about potential benefits but also about potential requirements, broadly referring to the costs (or 'sacrifices') a receiver faces, such as required financial and/or time investments. Based on her/his perception and interpretation of a corresponding signal, the receiver will then form cost expectations with regard to the signaller's offering. Translated to our study context, this means that platform-specific gatekeeping procedures and other input controls signal to prospective complementors what requirements they need to fulfil in order to get access to a given platform (e.g., bank account information, upload of a government-issued certificate for status verification), thereby enabling them to assess the expected costs, or efforts, associated with joining this

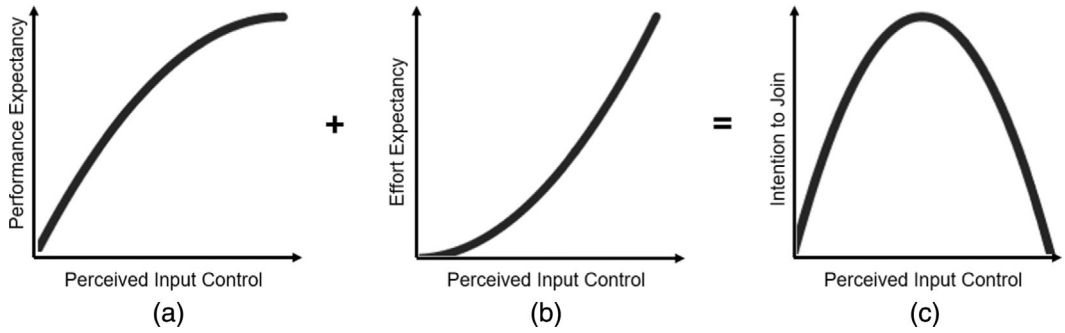

FIGURE 2 Hypothesized relationships between perceived input control and (a) performance expectancy, (b) effort expectancy and (c) intention to join

platform. The latter usually rise with the degree of input control enacted by a digital platform, as higher levels of input control tend to require the provision of more (detailed) information.

Still, similar to H1, we do not expect a linear, but rather a curvilinear relationship between prospective complementors' perceptions of input control and their effort expectancy. This can be explained by the practical observation that low levels of input control typically require prospective complementors to submit basic information that is readily available and thus easy to provide (e.g., contact information, bank account details). Yet, with increasing levels of input control, prospective complementors are asked to provide additional information that can be very difficult and tedious to acquire (e.g., recommendation letters or government-issued certificates in the case of donation-based crowdfunding). Put differently, heightened levels of input control tend to entail increased efforts not only for providing/entering the required (additional) information, but also for collecting the often hard-to-obtain add-on information (e.g., Croitor & Benlian, 2019). Following this line of argument, we put forward that the expected costs that prospective complementors associate with joining a digital platform grow exponentially with their perceptions of input control; that is, that the marginal increase in effort expectancy increases with each incremental gain in perceived input control (see Figure 2b). Thus, we hypothesize:

> **H2.** *As perceived input control increases, effort expectancy increases at an increasing rate (i.e., convex-shaped relationship).*

3.3 | The mediating and overall effects of input control on intention to join

Signalling theory also implies that receivers use and interpret a given signal to form a behavioural intention (and make a decision). Yet, it does not account for more complex interpretations of one and the same signal and their aggregation (Connelly et al., 2011), such as the simultaneous consideration of expected benefits and costs that competitively influence the receiver's intention to accept the signaller's offer. To account for this aggregation of multiple interpretations, we draw on the ABC framework (Busse et al., 2016). This framework postulates that the overall effect of the antecedent variable on the outcome variable is the result of two competing indirect effects: a positive indirect effect via expected benefits and a negative indirect effect via expected costs. By integrating the ABC framework into signalling theory, we can explain how the expected benefits and costs from one and the same signal influence the receiver's overall intention to accept the signaller's offer.

In the context of our study, the overall effect of perceived input control on prospective complementors' intention to join a digital platform corresponds to the sum of all underlying effects that arise from their calculus of

expected benefits (performance expectancy) and expected costs (effort expectancy). In this regard, H1 proposes that perceived input control increases performance expectancy at a decreasing rate (*concave* relationship; see Figure 2a), whereas H2 suggests that perceived input control increases effort expectancy at an increasing rate (*convex* relationship; see Figure 2b). This implies that, at some point, the incremental (expected) costs of perceived input control may become larger than its incremental (expected) benefits. Moreover, prior studies offer ample (empirical) evidence for the linear relationships between both performance expectancy and effort expectancy, on one side, and behavioural intentions, on the other side (e.g., Guo & Barnes, 2011; Neufeld et al., 2007; Pramatari & Theotokis, 2009). In line with these studies, we expect that performance expectancy linearly increases intention to join and effort expectancy linearly decreases intention to join.

In view of the competitive role of performance and effort expectancy in prospective complementors' calculus regarding their intention to join a platform (as suggested by the ABC framework); the curvilinear relationships between perceived input control and both performance expectancy and effort expectancy (as proposed by H1 and H2, respectively); as well as the linear relationships between performance/effort expectancy and intention to join, we suggest that the overall effect of perceived input control on intention to join follows an inverted U-shape curve (Busse et al., 2016). Specifically, we argue that the incremental benefits of prospective complementors' performance expectancy outweigh the incremental costs of effort expectancy at lower levels of perceived input control; whereas, at higher levels, we argue that the incremental costs of effort expectancy outweigh the incremental benefits of performance expectancy. Accordingly, prospective complementors exhibit higher intentions to join a platform when they perceive a moderate degree of input control (as opposed to a low or high degree). We therefore suggest:

H3. *Performance expectancy mediates the effect of perceived input control on intention to join, such that a prospective complementor is more likely to join a platform the higher the perceived input control due to higher levels of performance expectancy.*

H4. *Effort expectancy mediates the effect of perceived input control on intention to join, such that a prospective complementor is less likely to join a platform the higher the perceived input control due to higher levels of effort expectancy.*

H5. *The relationship between perceived input control and intention to join follows an inverted U-shape curve.*

4 | METHOD

The overarching goal of our study is to uncover the complex chain of relationships between prospective complementors' perceived input control and their intention to join a digital platform. With this goal in mind, we opted for an online experiment with three conditions. Two main reasons informed this choice: First, compared to standard survey research, experimental methods offer the advantage of higher internal validity by linking cause and effect through the specific manipulation of one or more variables, while controlling for extraneous variables (Bhattacherjee, 2012). Second, by manipulating perceived input control in a targeted fashion, we were able to gather participants' reactions to a broad range of different input control levels, regardless of their previous experience with platform registration processes.

4.1 | Platform context

We decided to conduct our investigation in the context of donation-based crowdfunding platforms. Such platforms allow organizations to raise funds from a large and distributed group of potential donors and have steadily gained momentum and scale in recent years (e.g., Chervyakov & Rochell, 2019; Choy & Schlagwein, 2016). More specifically,

we chose this study context for three main reasons: First, crowdfunding platforms have been used several times as a prototypical research context to explore the effects of input control on complementors and their complements (e.g., Thies et al., 2018; Wessel et al., 2017). Also, facilitating digital interactions and transactions among providers, complementors and users, donation-based crowdfunding platforms can be seen as a prime example of digital platforms (e.g., Eisenmann et al., 2011; Foerderer et al., 2018; McIntyre & Srinivasan, 2017). Second, donation-based crowdfunding platforms tend to vary considerably in terms of the input control mechanisms they employ, ranging from no requirements at all to very strict requirements, such as the required submission of multiple letters of reference. This variety of input control is ideal for our study, which aims at uncovering how different levels of input control are related to prospective complementors' intention to join. As such, we can ensure noticeable differences between platform-specific input control manifestations (low vs. medium vs. high) without compromising realism in our experimental setup. Third and last, donation-based crowdfunding platforms are susceptible and notorious for attracting opportunists and scammers, as these digital platforms often allow them to exploit the goodwill of users who are passionate about some topics or simply the idea of doing good (e.g., Perez et al., 2020). As well, there are many fundraisers who are well intentioned and honest but still fail to deliver on their promises. For these reasons, the use of input control is both especially important and controversial on donation-based crowdfunding platforms, protecting users from undesirable projects while also deterring complementors from offering potentially valuable social projects.

4.2 | Manipulation of input control

To test the effects of perceived input control, we created a fictitious donation-based crowdfunding platform called *WorldBetterFuture*. We decided to build our own crowdfunding platform instead of using an existing one to avoid preconceived attitudes based on potential past interactions with the platform. The platform design consisted of a homepage with a short explanation of the platform purpose (see Figure 3) and the access requirements for campaign publishers.

Based on the access requirements used by real-life donation-based crowdfunding platforms (e.g., *Globalgiving.org*, Betterplace.org), we developed three manipulation levels of input control (i.e., low, moderate, high). Please refer to Table 1 for an overview of the specific access requirements we communicated to participants.

We first conducted a pretest ($N = 60$) to make sure that participants perceived our manipulations of input control as intended. Pretest participants were recruited via *Prolific Academic* (Palan & Schitter, 2018). In exchange for a small payment, they inspected the *WorldBetterFuture* platform (with one of three randomized input control levels). Measuring perceived input control with a three-item scale developed by Croitor and Benlian (2019), we found that all pairwise comparisons revealed a significant difference ($p < 0.001$) between participants' perceptions of input control in each group ($N_{low} = N_{moderate} = N_{high} = 20$, $Mean_{low} = 1.87$, $Mean_{moderate} = 3.36$, $Mean_{high} = 4.65$). We can thus conclude that our manipulations of input control were perceived as intended.

4.3 | Data collection and experimental procedure

We used chat forums and social media to contact campaign organizers who had published one or several campaigns on a donation-based crowdfunding platform in the past or considered doing so in the near future. This helped us ensure that our sample is representative for campaign organizers using crowdfunding platforms (Mendelson, 2007). Also, for every completed survey, we funded the planting of a tree, which had been communicated to study participants beforehand. In doing so, we appealed to the altruistic purpose most charity organizations are based on, which allowed us to motivate and target organizers of charitable campaigns (Hass et al., 2014).

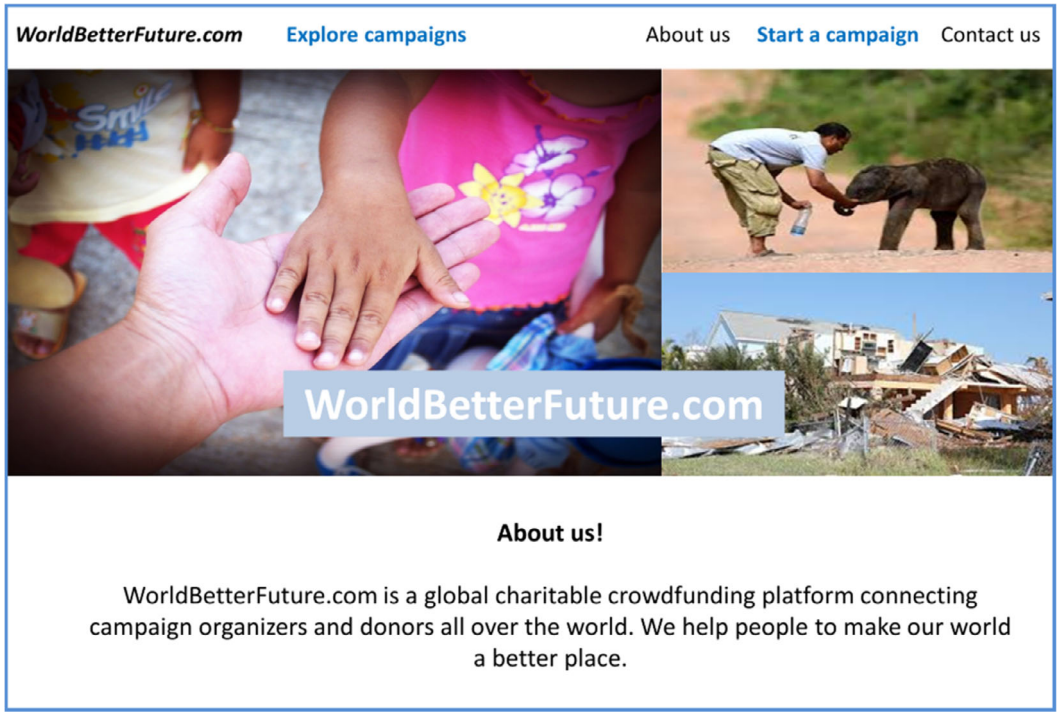

FIGURE 3 Homepage of the *WorldBetterFuture* platform

TABLE 1 Manipulations of input control

Input control level	Communicated access requirements
Group IC_{low}	"There are no requirements you have to fulfil to get your campaign published. We are open to all campaign organisers."
Group $IC_{moderate}$	"You must provide: name of campaign organizer; bank account information; certificate of government registration."
Group IC_{high}	"You must provide: name of campaign organizer; bank account information; certificate of government registration; program materials; letter of reference from funder; funding documents signed by board members; current year budget."

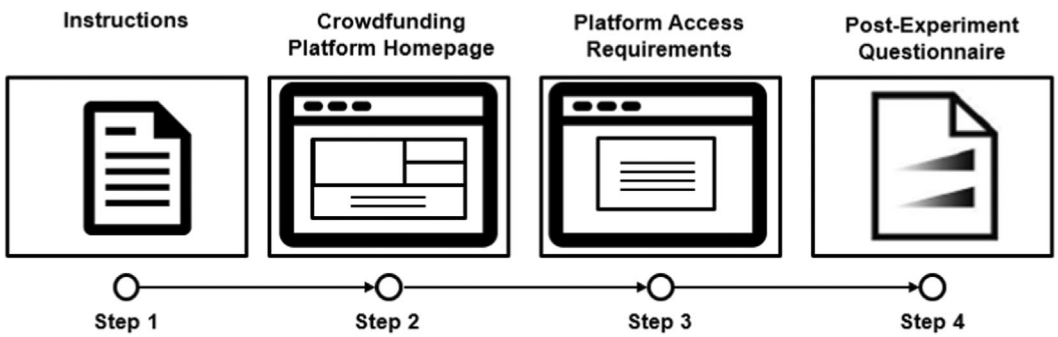

FIGURE 4 Experimental procedure

Figure 4 gives an overview of the experimental procedure. To start with, study participants were asked to imagine that they came across the *WorldBetterFuture* platform when looking for a crowdfunding platform in order to start a new online charity campaign on behalf of their charitable organization. After familiarizing themselves with the platform homepage, participants proceeded to another page, which provided them with information about the campaign publication process, and in particular about the (treatment group-specific) access requirements of the platform (see Table 1; participants were not required to enter/submit the information/documents listed in the access requirements). Finally, participants completed a questionnaire on their perceptions of the platform and their intention to join, alongside control variables and demographic information.

4.4 | Measurements

To operationalize our constructs, we used and adapted existing measures (see Table A2). We measured perceived input control using the same three-item scale employed in the pretest (Croitor & Benlian, 2019). To measure performance expectancy and effort expectancy, we used the respective four-item scales by Venkatesh et al. (2012); and to measure prospective complementors' intention to join, we adapted a three-item scale developed by Venkatesh et al. (2003). All items were assessed on seven-point Likert-type scales, ranging from 1 ('strongly disagree') to 7 ('strongly agree'). In addition, the questionnaire also included demographics (age, gender, country and education) and control variables (participant's experience with publishing donation-based crowdfunding campaigns, charity topic/context in which she or he has been active, as well as organization size) to rule out alternative explanations.

4.5 | Sample description

In total, 287 participants took part in our experiment. Responses from six participants who failed at least one of our attention checks were excluded. Furthermore, we dropped 10 participants who were not part of our target group (i.e., neither published a campaign in the past nor planned to do so in the future). In addition, we excluded seven cases due to implausibly short completion times (i.e., under 3 min, while the overall mean was 6 min). This resulted in a final sample size of 264 participants, which is considered appropriate for an experimental study design with three groups (Lenth, 2001).

About two thirds of the study participants were female (64.4%) and about one third was between 25 and 34 years old (33.0%). The largest fractions of our respondents lived in the United States (45.8%) and Germany (28.8%), followed by the United Kingdom (7.6%). A considerable number of the participants had already published more than four campaigns (24.6%). Also, most participants worked for small organizations with 1–9 employees (49.6%) and in charitable contexts focusing on environmental issues (30.7%), education (17.8%) and health (14.0%). A summary of the sample demographics is shown in Table A3.

To ensure that there is no difference between the subjects in our three treatment groups, we conducted an ANOVA based on our sample demographics. As we found no significant differences with respect to any demographic variable (all $p > 0.05$), we are confident that our randomization process was successful.

4.6 | Measurement model assessment and manipulation checks

We assessed our measurement model by examining the reliability and validity of our constructs (Bhattacherjee & Premkumar, 2004) (see Table A4 for details). First, the loadings of all items exceeded the recommended threshold of 0.70 and were significant ($p < 0.001$), indicating item reliability (Carmines & Zeller, 1979). Second, the values of composite reliability ranged from 0.93 to 0.95, which is higher than the recommended threshold of 0.80, suggesting

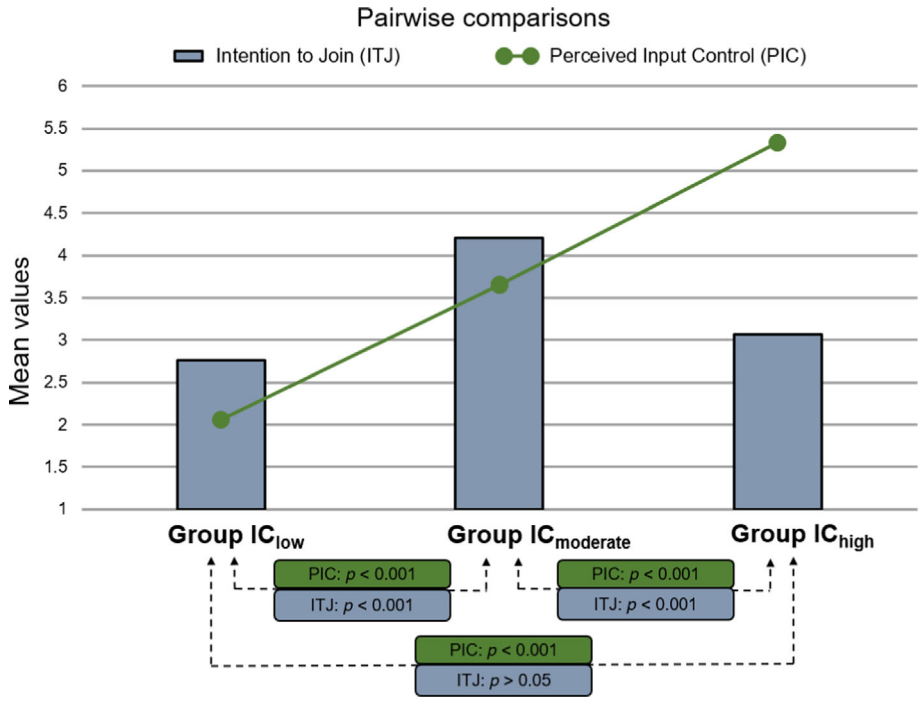

FIGURE 5 Pairwise comparisons of perceived input control and intention to join (across treatment groups)

construct reliability. Third, the values of average variance extracted ranged from 0.82 to 0.88, thereby exceeding the desired value of 0.50, demonstrating adequate convergent validity (Fornell & Larcker, 1981). Lastly, we evaluated discriminant validity using heterotrait–monotrait (HTMT) analysis, which is an alternative approach to assessing discriminant validity (O'Leary-Kelly & Vokurka, 1998). The highest HTMT value (0.69) was between perceived input control and effort expectancy (see Table A5 for details). As such, all HTMT values were well below the recommended threshold of 0.90 (Henseler et al., 2015), establishing discriminant validity.

Prior to the assessment of our structural model, we also conducted manipulation checks and evaluated perceived input control and intention to join in each of our treatment groups using Tukey's Honestly Significant Difference test (Tukey, 1949). Consistent with the pretest, all pairwise comparisons revealed significant differences (all $p < 0.001$) between the level of input control perceived in each group, as shown in Figure 5 (see Table A6 for more details). These results reconfirm that our input control manipulations were successful. Moreover, intention to join revealed significant differences between Group IC_{low} and Group $IC_{moderate}$, as well as between Group $IC_{moderate}$ and Group IC_{high}. However, we did not find a significant difference between Group IC_{low} and Group IC_{high}, providing first indications of an inverted U-shaped relationship between perceived input control and intention to join (see H5).

5 | RESULTS

To test our hypotheses, we conducted hierarchical regression analysis. Table 2 provides the results from running multiple hierarchical models (Aiken & West, 1991). In a first step, we analysed only the effects of our control variables (see Model M1) on the three dependent variables (performance expectancy, effort expectancy and intention to join). Next, we added the linear term of perceived input control (see Model M2). Lastly, we added the squared term of perceived input control (see Model M3) to test for curvilinear relationships (Baron & Kenny, 1986).

TABLE 2 Hierarchical regression analysis

Predicting variables	Performance expectancy			Effort expectancy			Intention to join		
	M1	M2	M3	M1	M2	M3	M1	M2	M3
PIC		0.64***	1.05***		0.58***	0.70*		0.15**	2.46***
PIC^2			−0.05*			0.07***			−0.31***
Age	0.22*	0.21*	−0.18	−0.19*	−0.20*	−0.20	0.10	0.10	0.07
Gender	0.25	0.24	−0.24	−0.16	−0.16	−0.15	−0.07	−0.07	−0.14
Country	0.01	0.01	0.09	0.01	0.01	0.01	−0.01	−0.01	0.01
Education	0.06	0.01	−0.06	−0.06	−0.10	−0.10	−0.02	−0.03	−0.07
Experience	0.02	0.01	0.10	0.04	0.04	0.03	0.09	0.08	0.09*
Topic	−0.10	−0.04	−0.14	−0.03	0.03	0.03	0.01	0.03	−0.01
Org. size	−0.01	−0.02	−0.02	0.02	0.01	0.01	0.03	0.03	0.01
R^2	5.7%	47.2%	49.7%	2.9%	42.4%	44.8%	1.8%	4.7%	43.2%
ΔR^2		41.5%	2.5%		39.5%	2.4%		2.9%	38.5%

Note: β-coefficients are unstandardized; $N = 264$.
Abbreviations: M, model; PIC, perceived input control.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

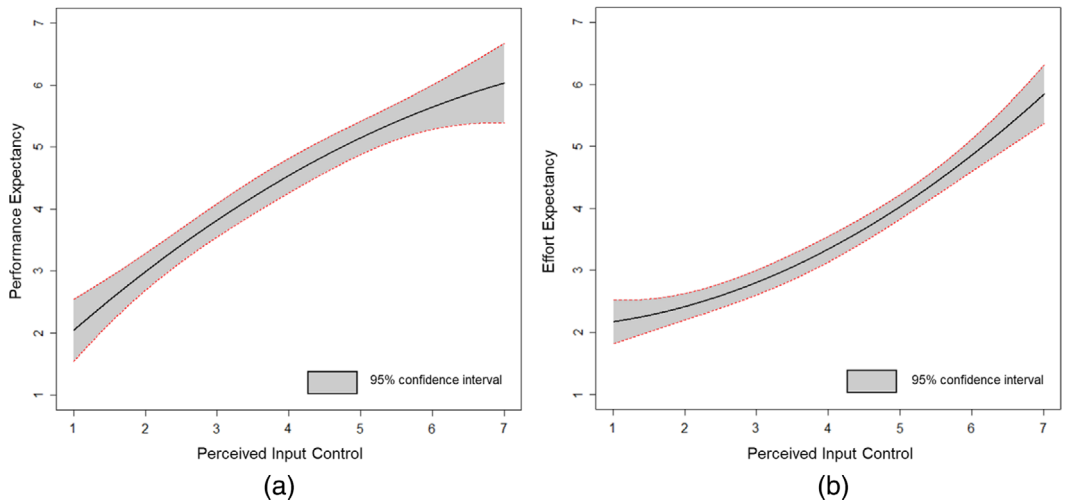

FIGURE 6 Relationship of perceived input control with (a) performance and (b) effort expectancy

For performance expectancy, the analysis results indicate that the linear term of perceived input control is positive and significant ($\beta_{linear} = 1.05$, $p < 0.001$), as well as that the squared term is negative and significant ($\beta_2 = -0.05$, $p < 0.05$). Adding the squared term (in M3) increased the explained variance (R^2) by 2.5%, suggesting that a curvilinear effect is present, supporting H1. We plotted the relationship between perceived input control and performance expectancy to further investigate the functional form of this relationship (Haans et al., 2016). Figure 6a points to a concave-shaped relationship and shows that the turning point of this graph is to the right of the figure and thus outside the data range.

For effort expectancy, the results show that the linear term of perceived input control is positive and significant ($\beta_{linear} = 0.70$, $p < 0.05$) and that the squared term is positive and significant, too ($\beta_2 = 0.07$, $p < 0.001$). The addition

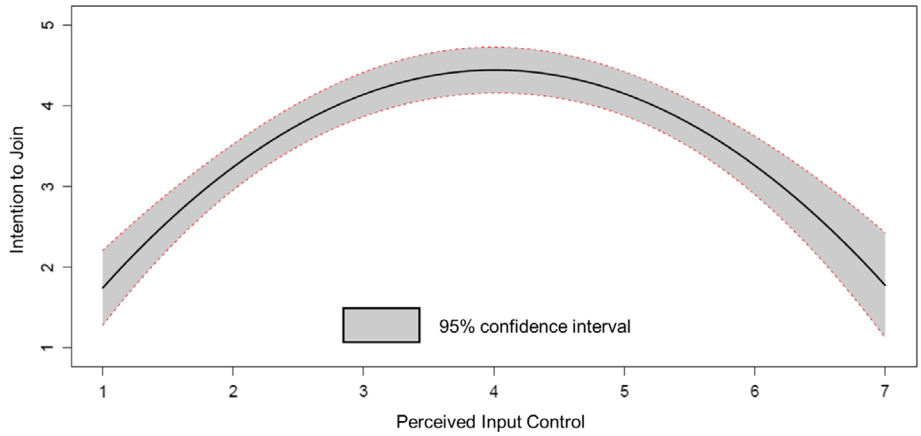

FIGURE 7 The curvilinear relationship between perceived input control and intention to join

of the squared term (in M3) increased the explained variance (R^2) by 2.4%, suggesting that a curvilinear effect is present, which supports H2. Again, we plotted the relationship between perceived input control and effort expectancy to inspect the functional form of this relationship. Figure 6b indicates a convex-shaped relationship and shows that the turning point is to the left of the figure and thus outside the relevant data range.

To test H3 and H4, we conducted two mediation analyses using MEDCURVE (Hayes & Preacher, 2010). The MEDCURVE procedure is based on ordinary least square regression, uses bootstrapping to determine confidence intervals and enables the analysis of curvilinear relationships between constructs. In particular, it allows us to determine the indirect effect θ of the independent variable *X* (i.e., perceived input control) on the dependent variable *Y* (i.e., intention to join) through the mediating variables *M* (i.e., performance/effort expectancy) at low, moderate, and high levels of *X*. In the following, we present our mediation analysis results based on 95% bias-corrected confidence intervals (CI = [lower bound, upper bound]).

H3 suggests that perceived input control affects prospective complementors' intention to join a digital platform through performance expectancy. Here, the results of our mediation analysis show that the indirect effect between perceived input control and intention to join is significant at all three levels of perceived input control: low levels ($\theta_{low} = 0.33$, CI = [0.20, 0.45]), moderate levels ($\theta_{moderate} = 0.24$, CI = [0.15, 0.36]) and high levels ($\theta_{high} = 0.06$, CI = [0.02, 0.11]). Please note that this indirect effect becomes smaller with increasing levels of perceived input control, but still remains significant. As such, our analysis results reveal that performance expectancy mediates the relationship between perceived input control and intention to join, offering support for H3.

H4 posits that perceived input control affects intention to join through effort expectancy. As for H3, the mediation analysis results show that the indirect effect is significant at low ($\theta_{low} = -0.11$, CI = [−0.19, −0.06]), moderate ($\theta_{moderate} = -0.20$, CI = [−0.27, −0.14]) and high ($\theta_{high} = -0.28$, CI = [−0.39, −0.19]) levels of perceived input control, whereby the indirect effect becomes larger with increasing levels of the latter. This means that effort expectancy mediates the relationship between perceived input control and intention to join, supporting H4.

Finally, we move on to test H5, which concerns the (direct) relationship between perceived input control and intention to join. As displayed in Table 2, the coefficient for the linear term is positive and significant ($\beta_{linear} = 2.46$, $p < 0.001$), whereas the squared term is negative and significant ($\beta_{quadratic} = -0.31$, $p < 0.001$). The addition of the squared term (in Model 3) increased the explained variance (R^2) in intention to join substantially by 38.5%, suggesting the presence of a curvilinear effect. Next, we looked at the direct effect of perceived input control on intention to join before and after adding the mediation terms (Hayes, 2022). Based on the mediation analyses with 5000 samples and 95% confidence intervals, we find that the direct effect of input control becomes insignificant once we account for the two indirect effects, which indicates that performance expectancy and effort expectancy fully mediate the

effects of perceived input control (Baron & Kenny, 1986; Zhao et al., 2010). Furthermore, we estimated the turning point (calculated as $-\beta_{linear}/2\beta_{quadratic}$; see Haans et al. (2016)), which is located at the perceived input control value of 4.0. Figure 7 visualizes the direct relationship and presents the 95% confidence intervals. Lastly, we compared the results of the quadratic model with alternative, non-linear (i.e., logarithmic, cubic, exponential) models. The estimation of all these models resulted in a poorer fit (i.e., lower R^2), suggesting that a quadratic model with squared terms fits the data best (Haans et al., 2016). Taken together, the results of the performed analyses also provide support for H5.

6 | DISCUSSION

The success of digital platforms largely hinges on complementors and their participation in and contributions to platforms (e.g., Benlian et al., 2015; Huang et al., 2017; Thies et al., 2016). Although research has recognized the importance of input control as a governance function, it has largely neglected the signalling role that input control plays in shaping prospective complementors' expectations regarding the benefits and costs associated with their decision to join a platform. Therefore, the main objective of this study was to explore how complementors' perceived input control affects their performance expectancy and effort expectancy, and ultimately their intention to join a digital platform. The study results reveal that input control has distinct and complex signalling effects. More specifically, we find that as perceived input control increases, performance expectancy increases at a decreasing rate (i.e., concave-shaped relationship) and effort expectancy increases at an increasing rate (i.e., convex-shaped relationship). Performance and effort expectancy are in turn linearly related to prospective complementors' intention to join. Given the competing nature of these underlying effects, our results point to an inverted U-shaped relationship between complementors' perceived input control and their intention to join. This implies that intention to join can be maximized by means of a moderate level of perceived input control, but neither by a low nor by a high level of perceived input control.

6.1 | Contributions to research

With our findings, we contribute to the platform literature in two important ways.[1] First, our study offers a new perspective on the role of input control as a decisive signal for shaping prospective complementors' expectations regarding the benefits and costs associated with their decision to join a digital platform. Previous research has predominantly investigated input control in terms of its governing function for regulating platform access and striking a balance between openness (i.e., market regulation) and control (i.e., platform regulation); that is, the prevailing assumption of earlier studies has been that input control affects platform actors (i.e., complementors and users) only *after* their decision to join a given platform (e.g., Benlian et al., 2015; Thies et al., 2018; Wessel et al., 2017). Yet, as theorized in and empirically supported by our study, input control also performs an important signalling function that shapes prospective complementors' expectations and intentions *before* they join a digital platform. Our study thus brings the anticipatory nature of input control to the fore, thereby shifting the perspective from its effects on complementors who have already decided to join a platform (*a post-entry perspective*) to its effects on prospective complementors who have yet to make a decision (*a pre-entry perspective*). Bringing the signalling function of input control into focus is crucial because it adds a new theoretical perspective to the study of platform openness by deepening our understanding of how exactly platform selectivity shapes prospective complementors' sense-making and behavioural intentions. As such, our study also extends existing literature by adding an important yet largely overlooked antecedent (i.e., input control) to the nascent research on third-party complementors' trade-off considerations and intentions to join platforms (e.g., Chen et al., 2022; Kathuria et al., 2020; Kretschmer et al., 2022).

Second, we contribute to research on digital platforms by uncovering the complex chain of relationships between prospective complementors' perceived input control and their intention to join a platform. Previous IS

studies have rested on the implicit assumption that less input control is received positively by complementors; consequently, most of them have focused on *linear* (i.e., quite simplistic) relationships between input control and complementors' intentions and behaviours (e.g., Croitor et al., 2021; Croitor & Benlian, 2019; O'Mahony & Karp, 2022). Our study departs from this assumption by providing empirical evidence that input control affects complementors' intention to join a digital platform via two *competitive* mediating mechanisms (i.e., performance expectancy and effort expectancy) that exhibit *curvilinear* effect patterns: while perceived input control increases performance expectancy at a decreasing rate, it increases effort expectancy at an increasing rate. Combined, these two opposing mediating mechanisms explain why a moderate level of input control is superior to a low or a high level in relation to maximizing prospective complementors' intention to join (*inverted U-shaped* relationship). Specifically, in line with our theorizing, our study results suggest that the incremental costs of effort expectancy outweigh the incremental benefits of performance expectancy at high levels of perceived input control, whereas the incremental benefits of performance expectancy outweigh the incremental costs of effort expectancy at low levels of perceived input control. While our observation that high levels of input control deter complementors from joining a platform already finds support in earlier studies (e.g., Tiwana, 2015a; Wessel et al., 2017), our finding that low levels of input control render a digital platform just as unattractive to complementors is novel and intriguing. Taken together, the study findings advance our understanding of how the attraction versus deterrence effects of a platform's input control mechanisms shape prospective complementors' cost–benefit calculus, and ultimately their intention to join a digital platform.

6.2 | Implications for practice

Beyond these contributions to research, our study also offers important practical implications. First, while platform providers exercise control to govern existing complementors, they also need to attract new complementors in order to sustain platform growth and secure its economic survival. Accordingly, it is crucial for platform providers to understand that input control not only works as a governing tool but also as a signalling tool. Neglecting the signalling function of input control may have unintended detrimental effects on prospective complementors' decision to join a digital platform, and thus on the growth and sustainability of the platform. This is particularly relevant for providers of crowdfunding platforms, given their mission to democratize participation and to attract as many complementors and users as possible, while at the same time ascertaining that their digital platform does not get 'hijacked' and used for fraudulent purposes (or the like).

Second, the study results suggest that prospective complementors exhibit higher intentions to join when perceived input control is at a moderate level, as opposed to a low or a high level. As such, our results debunk platform providers' common assumption that less input control translates into more complementors (e.g., Thies et al., 2018; Zhang et al., 2020). In particular, they highlight that decreasing input control has both a negative and a positive signalling effect for prospective complementors' intention to join. Given these results, we recommend that platform providers should strive for a moderate level of input control in an effort to find the sweet spot that maximizes prospective complementors' intention to join.

Third, the two key factors through which input control affects prospective complementors' intention to join (i.e., performance and effort expectancy) offer some interesting and actionable insights for platform providers regarding the design and presentation of enacted input controls. For example, providers should signal high-performance opportunities through the way in which they present relevant input controls on their platform (e.g., by clearly communicating that the purpose of corresponding controls is to safeguard platform quality). Similarly, platform providers should signal to prospective complementors that the efforts associated with the enacted input controls are well justified and worthwhile (e.g., by displaying testimonials of complementors, which provide some assurance that meeting a platform's access requirements will pay off).

Fourth and finally, platform providers need to consider how prospective complementors' initial perceptions of input control may shape complementors' perceptions of other controls used on the platform. In the end, input

control is only one element of platform control out of a larger portfolio of formal and informal controls (e.g., behaviour control, clan control) (e.g., Wiener et al., 2016). Correspondingly, the platform-specific use of input control may be interpreted as a harbinger for the employed portfolio (and balance) of formal and informal controls. For example, at the one extreme, prospective complementors may decide against joining a platform with loose input controls if they interpret the latter as a likely indicator for the 'over-crowdedness' of the platform (with low-quality complementors) and the inadequateness of the platform's overall control portfolio (including its use of behavioural and outcome controls). At the other extreme, strict input controls may, at least for some prospective complementors, make it more appealing to join a given platform because of their quality-assuring procedures. However, this restriction in access may require the platform provider to calibrate its other controls in a way that compensates for the potential downside of a more homogenous group of complementors; that is, in a way that enables and ensures platform innovation, diversity, and inclusion (e.g., Thies et al., 2018; Wessel et al., 2017). Therefore, providers need to understand that their use of input control does not only signal to prospective complementors how inclusive or selective a platform is, but also that it has implications for the configuration and enactment of other platform controls, which in turn may impact prospective complementors' intention to join as well.

6.3 | Limitations and directions for future research

The results of our study should be interpreted with several limitations in mind, which in turn point to promising opportunities for future research. First, our experimental setup did not allow us to measure prospective complementors' actual behaviours but focused on their behavioural intentions. Prior studies, however, have shown that behavioural intentions correlate with actual behaviours (e.g., Venkatesh et al., 2012; Venkatesh & Brown, 2001). Thus, measuring prospective complementors' behavioural intentions provides a reasonable indication of their actual behaviour. Nonetheless, future studies should verify our empirical results through field experiments that capture actual behaviours.

Second, our in-depth examination of the relationship between prospective complementors' perceived input control and their intention to join a digital platform focused on one key benefit (i.e., performance expectancy) and one key cost factor (i.e., effort expectancy). As such, we would like to encourage researchers to explore other potential benefits and costs relevant for prospective complementors' calculus to join a digital platform. For example, on the one hand, if a platform required prospective complementors to disclose highly sensitive information, complementors may perceive privacy concerns as an additional cost factor resulting from input control. On the other hand, trusting beliefs may be perceived as another benefit associated with input control, especially on platforms where a trustworthy climate between complementors and users is necessary to ensure successful interactions.

Third, our study was conducted in the context of donation-based crowdfunding platforms. Even though it is likely that the study results are applicable to input control on other crowdfunding platforms, the generalizability beyond the crowdfunding context might be limited. For instance, our findings may not be applicable to digital platforms that primarily employ other forms of control (e.g., output control) and thus put less emphasis on input control mechanisms. Complementors' attributes and demographics may also vary across different platform contexts and thus influence complementors' evaluation of the costs and benefits associated with perceived input control. We therefore call for future research to replicate our findings in other platform contexts, as well as to look into the signalling effects of other control forms.

Finally, we acknowledge that platform providers typically pursue at least a dual objective in that they aim to attract prospective complementors (i.e., to maximize their intention to join), while simultaneously asserting control over the quality of complementors and their complements (with the general goal of ensuring their platform's commercial success and long-term viability). In this regard, a promising avenue for future research may be to study the signalling effects of input control not only for prospective complementors' intention to join, but also its downstream effects on users' assessment of complement quality and their buying intentions. For example, platform users may be

concerned that a looser input control regime will force them to be more cautious in their participation decisions, since such a control regime will inevitably lead to a shift in quality control requirements in their direction and thus influence which users ultimately choose to be active on a given platform. Put differently, the chosen level of input control is arguably related to the degree of information asymmetries users must deal with. This also implies that, especially on platforms with rather low levels of input control, users cannot necessarily trust complementors as the latter may exploit opportunities to game the platform and them. An example for this can be found in 'all-or-nothing' crowdfunding, where some complementors set particularly meagre funding targets for their project. While doing so tends to increase the likelihood of project funding, it simultaneously increases the risk of failure to realize the proposed project. If the project then fails, users will feel disappointed and are likely to subsequently stop platform participation (e.g., Burtch et al., 2018; Wessel et al., 2021). As such, future research is warranted that sheds light on the complex chain of signalling effects that input control has on the intentions and behaviours of various platform actors, including both (prospective) complementors and users, and ultimately on platform sustainability in general.

7 | CONCLUSION

IS research on platform control has largely focused on examining how input control affects complementors' behaviours and intentions *after* their decision to join a digital platform. Yet, our understanding of how input control is perceived *before* this decision and how such perceptions influence prospective complementors' intention to join a platform is still nascent. Against this backdrop, our study set forth to shed light on the important signalling role of input control for prospective complementors' expected benefits and costs, and ultimately, for their intention to join. Based on a randomized online experiment in the context of donation-based crowdfunding, the study results offer empirical evidence that input control has distinct and complex signalling effects for prospective complementors. More specifically, our findings reveal curvilinear and competing signalling effects, in that perceived input control increases performance expectancy (at a decreasing rate) and effort expectancy (at an increasing rate). Moreover, we find that performance expectancy linearly increases prospective complementors' intention to join a digital platform, whereas effort expectancy linearly decreases their intention to do so. These underlying effects imply that the overall relationship between perceived input control and intention to join follows an inverted U-shaped curve; that is, that only a moderate level of perceived input control maximizes prospective complementors' intention to join. On this basis, our study provides novel insights for research with important practical implications for providers and the long-term success of their digital platforms, which ultimately depends on the decisions of new complementors to join the platform.

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DATA AVAILABILITY STATEMENT

Authors elect to not share data.

ORCID

Martin Adam https://orcid.org/0000-0001-9369-7203
Evgheni Croitor https://orcid.org/0000-0002-2602-7311
Dominick Werner https://orcid.org/0000-0002-4605-5395

Alexander Benlian https://orcid.org/0000-0002-7294-3097
Martin Wiener https://orcid.org/0000-0001-6006-2594

ENDNOTE

[1] In Table A7, we use the approach suggested by Weber (2012) to further elaborate on our study's contributions to the existing body of research.

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AUTHOR BIOGRAPHIES

Martin Adam is postdoctoral researcher at the chair of Information Systems and e-services at Technical University of Darmstadt, Germany. He holds a PhD in information systems (IS) from the Technical University of Darmstadt. His research interests include human-computer interaction as well as the digital transformation of work and people. His work has been published in conferences such as *International Conference on Information Systems* (ICIS) or *European Conference on Information Systems* (ECIS) and in international journals such as *European Journal of Information Systems*, *Decision Support Systems*, *Communications of the Association for Information Systems* and *Electronic Markets*.

Evgheni Croitor holds a PhD in information systems and a master's degree in computer science from Technical University of Darmstadt. His research interests include digital platforms and platform governance. His work has been published in conferences such as *International Conference on Information Systems* (ICIS) and *European Conference on Information Systems* (ECIS) and in international journals such as *Electronic Markets* and *Journal of Decision Systems*.

Dominick Werner is a doctoral student at the chair of Information Systems and E-Services at Technical University of Darmstadt, Germany. He holds a master's degree in Automotive Engineering from the Technical University Munich. His research interests include web customization, empowerment, and digital platforms. His work has been published in conferences such as *International Conference on Information Systems* (ICIS) and *European Conference on Information Systems* (ECIS) and in international journals such as *Electronic Markets*.

Alexander Benlian is a chaired professor of Information Systems & E-Services at TU Darmstadt, Germany. His research focuses on algorithmic management, the digital transformation of work and people, IT

entrepreneurship, and human-computer interaction. His research has been published in *MIS Quarterly*, *Information Systems Research*, *Information Systems Journal*, *Journal of Management Information Systems*, *Journal of the AIS*, *Entrepreneurship Theory & Practice*, *Journal of Business Venturing*, *Journal of Service Research* and *MIS Quarterly Executive*, among others. He serves as Senior Editor at *European Journal of Information Systems* and as Associate Editor at *Business & Information Systems Engineering*.

Martin Wiener is a chaired professor of Information Systems and Business Engineering at TU Dresden in Germany, as well as an Affiliated Researcher at the University of Erlangen-Nürnberg (Germany) and the Stockholm School of Economics (SSE) Institute for Research (Sweden). His research focuses on the control and governance of digital transformation projects, algorithmic control/management (e.g., on online labour platforms), and data-driven organizations. His work has been published in top-tier IS journals, including *Information Systems Journal*, *Information Systems Research*, *Journal of Management Information Systems*, and *MIS Quarterly*. He currently serves as Associate Editor for *Business & Information Systems Engineering*, *Information Systems Journal*, and *Information Systems Research*, as well as on the Editorial Review Board of the *Journal of the Association for Information Systems* and *Information & Management*.

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APPENDIX A

TABLE A1 Review of key IS studies on platform control

Studies	Main variables	Input control	Type of control effects	Outcome variables/ effects	Intention to join	Function/role of control	Problematization based on Alvesson and Sandberg (2011)
Croitor et al. (2021)	Input control, clan control	Yes	Linear	Motivation, usefulness, satisfaction, continuance Intention	No	Governing	**(Implicit) assumptions in existing studies**: Input control serves a governance function; in particular, it is used by platform providers to screen and sort out new complementors (and complements), and to ensure goal-directed behaviour by complementors who have already joined the platform (*a post-entry perspective*). Accordingly, prior research has largely focused on how input control relates to (overall) platform performance, as well as how it affects existing complementors' *continuance* intentions *after* their decision to join a digital platform. In this regard, existing studies have mainly assumed *simple* (i.e., *linear)* effects of input control on outcome variables.
Croitor et al. (2020)	Input control	Yes	Linear	Usefulness, satisfaction, reuse intention	No	Governing	
Croitor and Benlian (2019)	Input control	Yes	Linear	Continuance intention	No	Governing	
Goldbach et al. (2018)	Formal control, self-control	No	Linear	Autonomy, application quality, continuance intention	No	Governing	
Shafiei Gol et al. (2019)	Quality control	No	Linear	Control system efficiency, governance effectiveness	No	Governing	
Thies et al. (2018)	Input control	Yes	Linear	Cross-side and same-side network effects	No	Governing	
Tiwana (2015a, 2015b)	Input control	Yes	Linear	Performance	No	Governing	
Wessel et al. (2017)	Input control	Yes	Linear	Number of campaigns, revenue, funding conditions	No	Governing	

(Continues)

TABLE A1 (Continued)

Studies	Main variables	Input control	Type of control effects	Outcome variables/ effects	Intention to join	Function/role of control	Problematization based on Alvesson and Sandberg (2011)
Zheng et al. (2019)	Social control, formal control	No	Linear	Opportunistic behaviour	No	Governing	
This study	Input control	Yes	Linear and non-linear	Intention to join, performance expectancy, effort expectancy	Yes	Signalling	**(Alternative) assumptions in this study**: Input control also serves a signalling function that carries crucial information for *prospective* complementors (*a pre-entry perspective*). As such, benefit–cost trade-offs (e.g., in terms of effort vs. performance expectancies) and *intention to join* a digital platform represent salient outcome variables. Given the competing mechanisms that prospective complementors weigh against each other (expected benefits vs. costs), the effect patterns between perceived input control and outcomes can be expected to also include more *complex* (i.e., *non-linear*) relationships.

TABLE A2 Construct measures

Construct	Measures: 1 (strongly disagree) to 7 (strongly agree)	Adapted from
Perceived input control (PIC)	Publishing my campaign on the *WorldBetterFuture* platform is subject to stringent screening processes.	Croitor and Benlian (2019)
	Overall, the *WorldBetterFuture* platform sets strict formal criteria for publication approval.	
	In my opinion, it is hard to publish my campaign on the *WorldBetterFuture* platform.	
Performance expectancy (PE)	I am sure the *WorldBetterFuture* platform is able to help me get donations for my campaign.	Venkatesh et al. (2012)
	The *WorldBetterFuture* platform helps me to raise donations for my campaign.	
	The *WorldBetterFuture* platform increases my productivity in obtaining donations for my campaign.	
	Using the *WorldBetterFuture* platform increases my chances of getting donations for my campaign.	
Effort expectancy (EE)	Complying with the publication requirements of the *WorldBetterFuture* platform would be time-consuming for me.	Venkatesh et al. (2012)
	Complying with the publication requirements of the *WorldBetterFuture* platform would be burdensome for me.	
	Complying with the publication requirements of the *WorldBetterFuture* platform would be costly for me.	
	Complying with the publication requirements of the *WorldBetterFuture* platform would be effortful for me.	
Intention to join (ITJ)	I intend to publish my campaign on the *WorldBetterFuture* platform in the future.	Venkatesh et al. (2003)
	I predict I would publish my campaign on the *WorldBetterFuture* platform in the future.	
	I plan to publish my campaign on the *WorldBetterFuture* platform in the future.	

TABLE A3 Sample demographics of the experiment respondents ($N = 264$)

Demographic variables		#	%	Demographic variables		#	%
Gender	Female	170	64.4	Experience	Considering publishing the first campaign	24	9.1
	Male	79	29.9				
	Other	5	1.9		One published	40	15.2
	Prefer not to say	10	3.8		Two published	54	20.5
Age	<18	0	0.0		Three published	48	18.2
	18–24	7	2.7		Four published	33	12.5
	25–34	87	33.0		More than four published	65	24.6
	35–44	65	24.6	Organization size	1–9 employees	131	49.6
	45–55	60	22.7		10–24 employees	60	22.7
	>55	45	17.0		25–49 employees	26	9.8
Education	High school or below	26	9.8		50–99 employees	13	4.9
					100–500 employees	25	9.5
	Bachelor	85	32.2		More than 500 employees	9	3.4
	Master	123	46.6	Topic	Education	47	17.8
	PhD	30	11.4		Environment	81	30.7
Country	USA	121	45.8		Animals	18	6.8
	UK	20	7.6		Health	37	14.0
	Germany	76	28.8		Arts and Culture	9	3.4
	Other	47	17.8		Other	72	27.3

TABLE A4 Convergent validity assessment

Construct	Mean	SD	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted
Perceived input control	3.75	1.75	0.85–0.94	0.89	0.93	0.82
Performance expectancy	4.17	1.71	0.90–0.93	0.95	0.95	0.86
Effort expectancy	3.42	1.62	0.86–0.92	0.93	0.95	0.82
Intention to join	3.52	1.56	0.92–0.94	0.93	0.94	0.88

TABLE A5 Discriminant validity assessment (heterotrait–monotrait analysis)

Construct	Perceived input control	Performance expectancy	Effort expectancy	Intention to join
Perceived input control				
Performance expectancy	0.55			
Effort expectancy	0.69	0.36		
Intention to join	0.19	0.44	0.20	

TABLE A6 Pairwise comparisons of perceived input control and intention to join

Input control	*N*	Perceived input control			Intention to join		
		Mean	SD	Difference	Mean	SD	Difference
Group IC_{low}	84	2.06	1.15	Group $IC_{moderate}$: −1.59*** Group IC_{high}: −3.27***	2.76	1.49	Group $IC_{moderate}$: −1.45*** Group IC_{high}: −0.31***
Group $IC_{moderate}$	86	3.65	1.29	Group IC_{low}: 1.59*** Group IC_{high}: −1.68***	4.21	1.28	Group IC_{low}: 1.45*** Group IC_{high}: 1.14****
Group IC_{high}	94	5.33	1.23	Group IC_{low}: 3.27*** Group $IC_{moderate}$: 1.68***	3.07	1.56	Group IC_{low}: 0.31 Group $IC_{moderate}$: −1.14***

Note: $N = 264$.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

TABLE A7 Elaboration and evaluation of study contributions

Evaluative aspects	Study contributions to existing body of research
Constructs	Our study's core construct is **input control**, which we examine in the specific context of digital platforms. In this regard, our study focuses on a hitherto under-researched role of this control mode; namely, its signalling role. In particular, we argue that input control not only fulfils a *governing* function in relation to *current* platform complementors, but also a *signalling* function in relation to *prospective* complementors and their **intention** to join a platform, which is another key construct of our study and which until now has been studied almost exclusively in relation to prospective platform users. As such, our study offers a fresh perspective on an established construct (input control), which in itself represents a novel and useful contribution to the IS literature on platform control, as well as to the IS and management literatures on intention to join. Additional main constructs are **performance expectancy** and **effort expectancy** (see also Figure 1 in the main text).
Associations	Our study captures both linearity and non-linearity (including concave-shaped, convex-shaped, and inverted U-shaped relationships), positive and negative effects, as well as the simultaneous existence of linear, curvilinear, and competing effects. Most notably, drawing on signalling theory and the ABC framework, we propose (and find empirical support) that the overall relationship between prospective complementors' perceptions of input control and their intention to join a digital platform follows an inverted U-shape, and that this relationship can be traced back to the complex interplay of multiple linear, non-linear, and competing underlying effects. Given the above, our study includes a combination of static and dynamic phenomena, which enables us to uncover the complex (chain of) relationship(s) between prospective complementors' perceived input control and their intention to join. This denotes a much-needed departure from previous research, which mainly focused on static phenomena; that is, on 'linear, non-interacting relationships' (cf. Lowry et al., 2019, p. A21). In particular, our study also includes **non-linear relationships** between perceived input control and performance expectancy (concave-shaped), between perceived input control and effort expectancy (convex-shaped), as well as between perceived input control and intention to join (inverted U-shaped). This means that for certain values of perceived input control, the respective dependent variable (i.e., performance expectancy, effort expectancy, as well as intention to join) changes differently than for other values, which 'is inherently a **dynamic approach** to study phenomena' (Lowry et al., 2019).
States and events	Based on the (four) constructs highlighted above, our study captures **multiple states**, which 'can also be conceived as a complex attribute' (Weber, 2012, p. 4). Specifically, we manipulate the level of input control (in terms of low, moderate, and high levels; see also Table 1 in the main text) and measure prospective complementors' performance

(Continues)

TABLE A7 (Continued)

Evaluative aspects	Study contributions to existing body of research
	expectancy, effort expectancy, and intention to join (by means of 7-point Likert-type scales; see also Table A2 above). As such, the individual state of each prospective complementor can be represented as a vector with four attributes (i.e., input control, performance expectancy, effort expectancy, and intention to join), such as the following ones: (low, 2, 2, 2), (medium, 4, 3, 4), or (high, 6, 6, 2). In addition, by manipulating the level of input control, our study—at least indirectly—also accounts for events. Generally, according to Weber (2012), an 'event that a thing [e.g., a prospective complementor] undergoes is represented by a change from one of its states to another of its states (at least one of its attributes [e.g., the level of perceived input control] changes values)' (p. 4).
Novelty	As indicated above, prior studies on platform control mainly assume that input control fulfils a governance function; i.e., that the sole purpose of this control mode is to screen and sort out new complementors (and complements) and to ensure their goal-directed behaviour after joining the platform. Accordingly, existing studies have largely focused on how input control relates to (overall) platform performance, as well as how it affects current complementors' continuance intentions. Further, previous studies are typically based on the assumption that input control has simple (i.e., linear) effects on outcome variables. In contrast, the results of the study at hand advance our understanding of input control by highlighting its **signalling function** for prospective complementors and their intention to join a platform (*a pre-entry* perspective), thereby going above and beyond its governing function for active complementors who have already joined a platform (*a post-entry* perspective). Moreover, our study results show that the overall relationship between perceived input control and intention to join follows an **inverted U-shape**, which can be explained by a complex combination of individual effects (including linear, non-linear, and competing ones), going beyond the previously assumed simple effects.

Note: In this table, we elaborate on how our study contributes to the existing body of research. To do so, we draw upon Weber's (2012) articulation of how to develop and evaluate theories (cf. Lowry et al., 2019, p. A21).