

# Gamified monetary reward designs: Offering certain versus chance-based rewards

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## Abstract

To motivate visitors to engage with websites, e-tailers widely employ monetary rewards (e.g., vouchers, discounts) in their website designs. With advances in user interface technologies, many e-tailers have started to offer *gamified monetary reward designs* (MRDs), which require visitors to earn the monetary reward by playing a game, rather than simply claiming the reward. However, little is known about whether and why gamified MRDs engage visitors compared to their non-gamified counterpart. Even less is known about the effectiveness of gamified MRDs when providing *certain* or *chance-based* rewards, in that visitors do or do not know what reward they will gain for successfully performing in the game. Drawing on cognitive evaluation theory, we investigate gamified MRDs with certain or chance-based rewards and contrast them to non-gamified MRDs with certain rewards in user registration systems. Our results from a multi-method approach encompassing the complementary features of a randomised field experiment ( $N = 651$ ) and a randomised online experiment ( $N = 330$ ) demonstrate differential effects of the three investigated MRDs on user registration. Visitors encountering either type of gamified MRD are more likely to register than those encountering a non-gamified MRD. Moreover, gamified MRDs with chance-based rewards have the highest likelihood of user registrations. We also show that MRDs have distinct indirect effects on user registration via

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anticipated experiences of competence and sensation. Overall, the paper offers theoretical insights and practical guidance on how and why gamified MRDs are effective for e-tailers.

#### KEYWORDS

cognitive evaluation theory, experiment, gamblification, gamification, monetary reward design

## 1 | INTRODUCTION

E-tailers highly depend on visitors engaging with their websites. As such, e-tailers require visitors not only to arrive at their websites but also, for example, to become registered users and ultimately purchase products. However, motivating visitors to engage with websites has become a critical challenge (e.g., Liu et al., 2017; Roethke et al., 2020). Indeed, the average e-tailer experiences that less than 3 percent of visitors engage with a website offer (Statista, 2021), and less than 25 percent of website visitors return to a website after their first visit (Monetate Inc, 2017).

To engage visitors, e-tailers increasingly employ website designs that incorporate monetary rewards, such as discounts and vouchers, which we refer to as monetary reward designs (MRDs) (e.g., Hann et al., 2007; Roethke et al., 2020; Xu et al., 2009). In this vein, over 40 percent of U.S. businesses already employ MRDs to increase customer engagement (KPMG, 2019). Given their prevalence and success, MRDs have been recognised as key factors that can engage visitors and ultimately nurture the prosperity of e-tailers' business models (e.g., Veit et al., 2014; Wang et al., 2020).

Due to advances in user interface technologies, e-tailers particularly use more responsive websites that allow for sophisticated MRDs based on gamification, that is utilising design elements drawn from game designs to create gameful experiences (e.g., Deterding et al., 2011; Hamari et al., 2014). As a result, the challenge of optimal MRDs has shifted from choosing *what* (i.e., the monetary reward) is offered to *how* the monetary reward is offered. In this regard, the formerly common *non-gamified MRD* in the form of a simple certain-reward-for-completed-target-activity exchange (e.g., 'If you sign up for our newsletter, you will receive a 20% discount on your next purchase!') has been increasingly replaced by more interactive, technology-enabled *gamified MRDs*. In contrast to non-gamified MRDs, *gamified MRDs* include the prospect of playing a game that playfully challenges a visitor's competence (i.e., skills and abilities), which determines, based on a visitor's in-game performance, whether or not the visitor receives a monetary reward. Of these gamified MRDs, particularly two salient types have emerged based on whether the monetary reward is certain or chance-based. On the one hand, gamified MRDs can offer *certain monetary rewards* for successfully performing in the game. As such, visitors know exactly what reward they will gain if they accept the e-tailer's request and perform as required in the game. For instance, Microsoft's Xbox Live Service (Clockwork Media, 2021) employs a gamified MRD to motivate user registration by offering the prospect of an online game to visitors post-registration, in which visitors can demonstrate their competence and thereby claim a certain discount for Microsoft products. Similarly, Conforama (2020), a European furniture chain, offered online quiz games for specific discounts based on correctly answered questions when visitors signed up for their newsletter. On the other hand, gamified MRDs can incorporate *chance-based monetary rewards* instead of certain ones. Accordingly, visitors can test and prove their competence by earning the reward through in-game performance, but they neither certainly know nor control which monetary reward they will eventually obtain. Starbucks (2020), for example, employs a gamified MRD with chance-based rewards to motivate user registration. Specifically, they offer the prospect of an augmented-reality game to visitors who decide to register for their loyalty program. Once they register, they can demonstrate their competence by finding and tapping on golden stars to reveal chance-based prizes. Similarly, the global frequent flyer program Miles & More employed gamified MRDs with chance-based rewards by offering an in-app quiz to win potential prizes of varying value (e.g., different amounts of award miles) based on luck for those users who registered for a mobility service and answered the quiz questions

correctly (Upgrade Guru Tech, 2022). This chance-based reward uncertainty in gamified MRDs may thus appeal to the visitors' sensations (e.g., curiosity, excitement) beyond providing competence-related game challenges, and thus may particularly motivate visitors to register to make these experiences.<sup>1</sup>

Although gamified MRDs have become increasingly ubiquitous, and the stakes are high for e-tailers who offer and experiment with such MRDs, our understanding of MRDs' differential effects on engaging visitors is far from conclusive. From our literature review of MRDs in IS research (see Table A1 in Appendix A), we identify the following two important research gaps. First, previous studies have largely treated MRDs as a monolithic block, using the term 'monetary reward' to refer to *what* is offered. Thus, the focus was mainly on the presence versus absence of monetary rewards and building upon fixed monetary rewards that an individual could certainly gain for a requested target activity (e.g., Hann et al., 2007; Hui et al., 2007; Xu et al., 2009). However, this broad-brush approach toward MRDs has resulted in little understanding of the role of *how* the visitors gain the monetary reward; that is, the mechanics governing the visitor–website interaction and conferral of monetary rewards. As a result, previous research has largely neglected the differential effects of gamified (vs. non-gamified) MRDs on engagement, including the role of certain versus chance-based rewards in gamified MRDs (e.g., Huang et al., 2021). These hitherto missing insights into gamified MRDs can improve our understanding of the effectiveness of distinct MRDs to engage visitors, as visitors may react differently to the same monetary reward if the MRDs employ different mechanics. Given that engaging visitors through non-gamified MRDs is often hard (e.g., Roethke et al., 2020), it is important to investigate whether and which gamified (vs. non-gamified) MRDs will likely provide the better yield and thus are recommendable to e-tailers. Second, although IS research has analysed the direct effects of monetary rewards on engaging visitors (e.g., Hann et al., 2007; Hui et al., 2007), the explanatory psychological processes of *why* MRDs motivate visitors to engage have mainly remained implicit. The visitors' anticipation and evaluation of the MRDs' different potentials to fulfil one or more of their psychological needs, such as a visitor's anticipated experiences of competence and sensation, may explain what drives their engagement. Understanding such processes will thus help to explain better what functions are at work that make MRDs effective.

As gamified MRDs provide interactive and motivating touchpoints for visitors, visitors will likely engage more with websites. A key indicator in practice to measure this engagement is user registration, that is when visitors decide to become registered users by signing up with their information (e.g., Huang et al., 2021; Roethke et al., 2020). Indeed, user registration is particularly important for e-tailers because of its early role in the relationship with visitors and its relevance as a neuralgic and thus crucial point to capture valuable information to, for example, improve data analytics, manage customer relationships, and employ targeted advertising (e.g., Awad & Krishnan, 2006; Chen & Stallaert, 2014; Li & Pavlou, 2013). When visitors arrive at a website, they face the decision to register for website-related services and usually evaluate in advance whether user registration is worth pursuing. In this vein, visitors anticipate what will happen once they decide to register and then evaluate whether the reward and related activity to get the reward are psychologically 'fulfilling'. As such, gamified MRDs may offer psychological benefits that can provide chances to improve user registrations beyond non-gamified MRDs. In contrast, the absence of gamified MRDs will likely present missed opportunities to motivate visitors toward user registrations and thus forgo occasions to improve business-related outcomes. Against this backdrop, we ask the following research question:

*How and why do gamified (vs. non-gamified) MRDs affect user registration?*

To address this research question, we leverage self-determination theory and specifically cognitive evaluation theory (Deci & Ryan, 1985; Ryan & Deci, 2017), which focuses on the interplay between monetary rewards and

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<sup>1</sup>We want to emphasise that we exclusively use the expressions 'certain rewards' and 'chance-based rewards' to refer to the certainty of what kind of monetary rewards are conferred if the visitor performs well in the game (i.e., success or no success). Accordingly, these terms do not include uncertainty related to an individual's performance (e.g., having a good or bad day), which would technically also contribute to the overall certainty of receiving a reward. We use these terms in their chosen forms for simplicity and to focus on what designers of MRDs can control, namely whether a visitor who performs well in a game will gain a specific monetary reward for certain or by chance.

psychological factors that influence an individual's intrinsic motivation. Accordingly, we develop a theoretical model for the intrinsically motivating effects of different types of MRDs on user registrations. We posit that distinct MRDs motivate visitors to varying degrees to become registered users through their potential to fulfil visitors' distinct needs, that is the anticipated experiences of competence and sensation. Building on this theoretical grounding, we apply a multi-method approach encompassing the complementary and corroborating features of a randomised field experiment ( $N = 651$ ) and a follow-up randomised online experiment ( $N = 330$ ). Both experiments reveal consistent evidence that gamified MRDs with certain or chance-based rewards are more likely to drive user registration than non-gamified MRDs with certain rewards. Moreover, gamified MRDs with chance-based rewards encourage visitors to register the most. Lastly, we find that MRDs have distinct indirect effects on user registration via anticipated experiences of competence and sensation.

In our paper, we make two main contributions to IS research on MRDs (e.g., Hann et al., 2007; Qiao et al., 2021). First, we extend prior research by revealing the differential effects of gamified (vs. non-gamified) MRDs on engaging visitors. We thus demonstrate that the way in which visitors gain monetary rewards matters. As such, we shift the conversation regarding MRDs from the prior perspective of *what* to offer to the increasingly important focus on *how* to offer monetary rewards, providing a more holistic understanding of what constitutes MRDs. Second, we shed light on the explanatory psychological processes (i.e., anticipated experiences of competence and sensation) underlying the direct effects of MRDs on engaging visitors. Consequently, we advance our understanding of *why* different MRDs are more or less effective. Beyond these theoretical contributions, our paper provides valuable guidance for e-tailers on which MRD they should choose to engage visitors and thus increase digital business success. Our findings specifically inform e-tailers that gamified (vs. non-gamified) MRDs with chance-based (vs. certain) monetary rewards provide a better yield for user registrations.

## 2 | RELATED LITERATURE AND THEORETICAL BACKGROUND







### 2.1 | Monetary reward designs

Our research mainly informs IS research on MRDs (e.g., Hann et al., 2007; Qiao et al., 2021). As presented in Table A1 in Appendix A, previous IS research on MRDs mainly focused on the effectiveness of certain types of MRDs in isolation and specifically on non-gamified MRDs (with certain monetary rewards). Accordingly, individuals usually received a certain monetary reward for completing a target activity (e.g., Luo et al., 2020; Son et al., 2020). For instance, IS research has studied non-gamified MRDs in the form of the presence versus absence of monetary rewards (Chen et al., 2019; Kuang et al., 2019), different kinds of monetary rewards (Hong et al., 2017; Qiao et al., 2020), and different amounts of monetary rewards (Hann et al., 2007). These non-gamified MRDs were then investigated as a means to motivate users to, for example, write reviews (Qiao et al., 2020), make referrals (Hong et al., 2017), and disclose information (Hui et al., 2007; Xu et al., 2009). In this vein, user registration has been a common variable to measure the success of MRDs, given its early and vital role in user onboarding and engaging visitors with website-related services (e.g., Hann et al., 2007; Qiao et al., 2021; Roethke et al., 2020).

Although previous IS research provided valuable insights into the effects of non-gamified MRDs with certain rewards, our main focus is on how MRDs can be improved regarding the under-investigated design mechanics of in-game performance in combination with the conferral of chance-based (vs. certain) monetary rewards. Considering the increasing proliferation of gamification (e.g., Liu et al., 2017; Lowry et al., 2020) and chance-based rewards (e.g., Adam et al., 2021; Macey & Hamari, 2020), it is likely that gamified MRDs and particularly gamified MRDs with chance-based rewards will become more important and may outperform non-gamified MRDs. Therefore, it will be relevant for e-tailers to understand better how gamified (vs. non-gamified) MRDs affect user engagement.

*Gamified MRDs* draw on gamification, which is usually referred to as the use of mini-games and specific game design elements in non-gaming contexts to create gameful experiences that engage and motivate users (e.g., Liu

**TABLE 1** Main commonalities and differences among the three investigated MRDs.

		The monetary reward is...	The conferral of the monetary reward depends on...		The characteristics of the monetary reward (e.g., amount) are...
Gamified MRD	With chance-based rewards	 Present	@ Completion of target activity (e.g., user registration)	 In-game performance	 Chance-based (any from reward 'menu')
	With certain rewards	 Present	@ Completion of target activity (e.g., user registration)	 In-game performance	Certain (not chance-based)
Non-gamified MRD		 Present	@ Completion of target activity (e.g., user registration)		Certain (not chance-based)

et al., 2017; Lowry et al., 2020). For instance, in contrast to non-gamified MRDs, the visitor–website interaction now ranges from a visitor (1) engaging in a target activity (e.g., providing an email address for user registration); over (2) participating in the respective game (e.g., puzzle, word, or arcade game); to (3) receiving monetary rewards based on in-game performance (e.g., succeeding or not succeeding). By introducing the prospect of game-play into the visitor–website interaction, the mechanics governing the conferral of monetary rewards change: Beyond rewards being contingent on completing the target activity, rewards are also contingent on specific in-game performance and thus often playfully challenging. Indeed, the incorporated games are usually designed along suitable competence parameters (e.g., difficulty, required time) that are appropriate for setting up a large share of visitors to perform well and thus motivating visitors (e.g., Liu et al., 2017; Ryan & Deci, 2017). Moreover, gamified MRDs usually communicate a positive spirit and thus provide motivating performance experiences for visitors playing for a monetary reward.

Two salient types of gamified MRDs have become particularly prevalent. In the gamified MRD with *certain monetary rewards*, visitors know exactly and largely control what monetary reward they gain for which performance. In contrast, a gamified MRD with *chance-based monetary rewards* incorporates chance-based uncertainty in the monetary reward. This latter MRD relates to gamblification, a recently emerging concept that considers incorporating chance-based design elements for gambling-like experiences to engage users (e.g., Adam et al., 2021; King et al., 2015; Macey & Hamari, 2020). Therefore, gamified MRDs with chance-based rewards include a game that allows the performance of a visitor to determine whether a monetary reward is provided, and they also incorporate the element of chance to determine what the monetary reward comprises. Moreover, gamified MRDs with chance-based rewards often do not initially reveal all possible monetary rewards to increase suspense and curiosity to engage visitors. Table 1 compares the most important differences among the three MRDs in our research.<sup>2</sup>

Our research aims to examine the differential effects of gamified (vs. non-gamified) MRDs with a particular focus on chance-based (vs. certain) rewards in gamified MRDs. Furthermore, we choose user registration as our key dependent variable because user registration has been a common variable to measure the effectiveness of MRDs in previous IS research (e.g., Hann et al., 2007; Qiao et al., 2021; Roethke et al., 2020). Moreover, user registration is vital for many e-tailers to influence visitors early in the user onboarding process (e.g., Huang et al., 2021). As such, user registration is relevant for both research and practice, thus a particularly intriguing dependent variable for our research on the effectiveness of different types of MRDs.

<sup>2</sup>We do not address the individual effects of non-gamified MRD with chance-based monetary rewards, as our paper's focus is on the role of gamification for MRDs, and previous research has already hinted toward the direct effects of purely chance-based rewards on outcomes (e.g., Shen et al., 2015; Shen et al., 2019).

## 2.2 | Self-determination theory and cognitive evaluation theory

To investigate the differential effects of MRDs on user registration, we draw on self-determination theory as our theoretical lens. Self-determination theory (Deci & Ryan, 2002; Ryan & Deci, 2017) is an empirically-based theory of human motivation that focuses on how motivation emerges and affects various outcomes, such as performance, psychological health, and well-being. The theory proposes an open-ended inventory of psychological needs whose fulfilments determine whether individuals feel self-determined and thus intrinsically motivated. Some of the most investigated needs are competence, the experience of effectiveness and mastery; autonomy, the experience of self-regulation and volition; and relatedness, the experience of social connection and warmth. Beyond these three common psychological needs, researchers continually develop and extend the theory, following objective guidelines for identifying new needs that are sufficiently distinct from the other identified needs (e.g., Baumeister & Leary, 1995; Ryan & Deci, 2017). Sensation, the experience of novelty and variety, is such a new need that has recently been introduced to the needs inventory (e.g., Bagheri & Milyavskaya, 2020; Vansteenkiste et al., 2020). Various researchers—including Richard Ryan as one of the researchers originally formalising and curating self-determination theory—proposed sensation as a new complementary need mainly after evidence in multiple studies suggested that sensation can predict individual motivation above and beyond the established psychological needs through its complementary focus on chance and change (e.g., Bagheri & Milyavskaya, 2020; González-Cutre et al., 2016; Vansteenkiste et al., 2020). Thus, sensation has been considered a relevant and revelatory need that extends the needs inventory.

Self-determination theory contains several sub-theories for application to various contexts (e.g., Ryan & Deci, 2017). One of the most applied and established sub-theories of self-determination theory is cognitive evaluation theory (CET) (e.g., Deci & Ryan, 1985; Deci & Ryan, 2002). CET explains how and why individuals cognitively evaluate an external event, thus affecting their motivation to pursue it. External events hereby usually comprise a target activity (e.g., doing a required task) and the related conferral of an external reward, usually a monetary reward (e.g., Deci & Ryan, 1985). The individual's cognitive evaluation can happen regarding past, present, and future events—whereby studies have mainly applied CET to explain when and why individuals decide to engage in future events (e.g., Ryan & Deci, 2017). Individuals cognitively evaluate future events by anticipating the event's likely characteristics and consequences, such as their experiences from doing the event's activities and the conditions under which they receive the rewards. As such, individuals can cognitively experience and thus evaluate whether and why they are motivated to engage in future events, so that conceived future events can operate anticipatorily as motivators of the individuals' current behaviours (cf. Bandura, 2009).

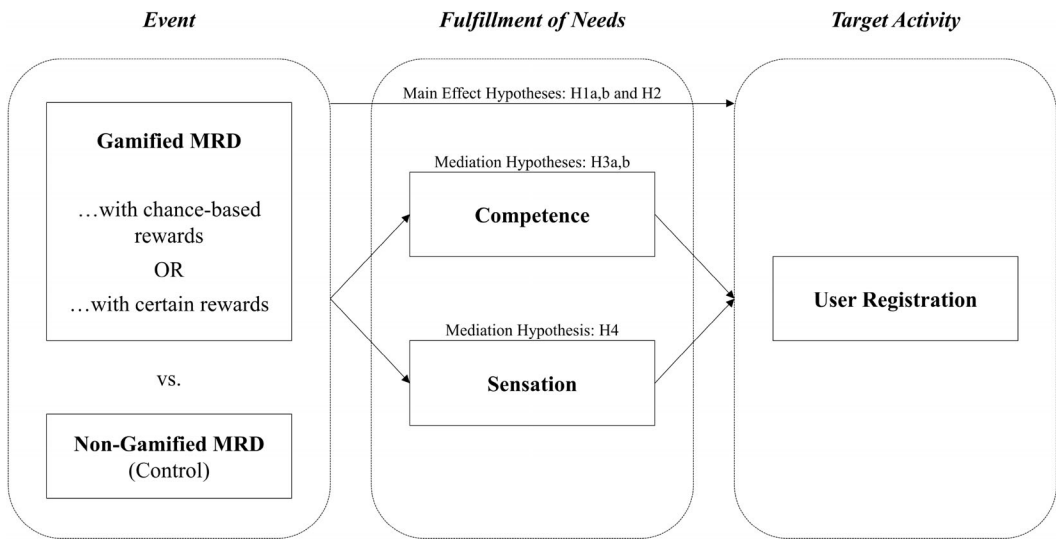
According to CET, an event's objective characteristics, such as the existence and amount of a monetary reward, can motivate targeted behaviour. However, these objective characteristics do not necessarily appeal to the individual's intrinsic motivation and therefore often do not unlock higher overall motivation. Indeed, one and the same monetary reward can differ in its effectiveness to motivate individuals depending on the event's overall design and the individuals' evaluation. Specifically, CET argues that individuals particularly care about an event's functional significance based on the event's psychological meaning (e.g., Deci & Ryan, 1985; Ryan & Deci, 2017). One crucial functional significance is an event's 'informational' aspect (cf. Ryan & Deci, 2017), that is whether and to what degree an individual deems an event likely to fulfil one or more of their psychological needs. For example, an event can allow an individual to experience competence for mastering a difficult task, thus fulfilling the individual's need for competence. The more an individual evaluates that engaging in an event can fulfil their needs, the more they deem engaging in the event intrinsically motivating—and the more likely they engage. Thus, CET offers three propositions that guide our research: (1) an individual encounters an event, that is a target activity linked to the conferral of a reward; (2) the individual cognitively evaluates whether and to what degree it can fulfil one or more of their psychological needs; and (3) if the event is considered needs-fulfilling, the individual is intrinsically motivated to engage in the event and will attempt to do so. Assuming that the monetary reward (and thus the extrinsic motivation) remains

objectively consistent across events, this cognitive evaluation of potential needs-fulfilment determines whether an individual is more or less intrinsically and thus overall motivated to engage in the event.

Several studies and research streams in IS draw on CET and the related self-determination theory as a theoretical lens to explain how digital environments and their designs affect an individual's motivation and related behavioural outcomes (e.g., Daniel et al., 2018; Durward et al., 2020). For example, IS research has demonstrated the theories' applicability and adequacy in the explicit context of motivating users through monetary rewards (e.g., Qiao et al., 2020) and in the application of gamification (e.g., Liu et al., 2017; Seaborn & Fels, 2015). Similarly, CET is a useful lens for our research. First, CET offers a parsimonious and theoretically justified way of investigating the effects of MRDs on user registration. Indeed, CET explicitly considers how the design of monetary rewards affects individuals' motivation to engage in events. As e-tailers employ monetary rewards in their MRDs to extrinsically motivate visitors to become registered users, CET is a suitable theoretical grounding for investigating the intrinsic and overall motivation to register due to distinct MRDs. Indeed, as CET mainly serves to understand external events for the influence of individual intrinsic motivation, it assists to understand how to design MRDs to influence user registrations better. Second, CET builds on the individuals' evaluation of whether and to what degree an event fulfils one or more of their psychological needs. For example, a website visitor's experience of competence as a result of successfully playing a challenging game may fulfil their need for competence, which can affect their motivation and thus decision to register. Given that a visitor usually has to make a registration decision before receiving the reward, they cannot directly experience all characteristics of the MRD, such as actually receiving the reward. As such, visitors evaluate the MRD's potential to fulfil their needs based on anticipated experiences. These anticipated experiences may explain why gamified MRDs motivate users to register beyond non-gamified MRDs. Indeed, researchers on MRDs have mainly focused on what kind and amount of monetary rewards to provide, largely neglecting the intrinsic motivation that gamified (vs. non-gamified) MRDs may evoke (e.g., Hann et al., 2007; Roethke et al., 2020; Wang et al., 2020). Moreover, the individual's evaluation of distinct MRDs fulfilling one or more psychological needs to different degrees may explain why distinct MRDs differ in their effect processes. Thus, MRDs' different needs-fulfilments may explain why gamified MRD with chance-based rewards are superior for user registration than non-gamified MRDs and gamified MRDs with certain rewards.

As our research aims to examine the differential effects of gamified (vs. non-gamified) MRDs on user registration with a particular focus on chance-based (vs. certain) rewards in gamified MRDs, we will focus our investigation on the fulfilment of psychological needs for which we expect crucial differences between the selected MRDs (e.g., Hong et al., 2014). Consequently, we aim our attention at competence and sensation as salient psychological needs, whose fulfilments affect an individual's motivation to engage in user registration. These anticipated experiences of competence and sensation reflect a concise picture of the crucial psychological processes underlying the differential effects of gamified (vs. non-gamified) MRDs and chance-based (vs. certain) rewards in gamified MRDs on user registration. Precisely, the anticipated experience of competence is likely to relate to gamified as opposed to non-gamified MRDs. Specifically, gamified (vs. non-gamified) MRDs build upon a completion-contingent reward, in that a visitor must not only register but also perform in a game to receive a monetary reward. As such, the event's activity is highly skill-contingent and thus related to a visitor's competence as only a specific performance level will provide access to the monetary rewards (e.g., Liu et al., 2013; Liu et al., 2017). On the other hand, the anticipated experience of sensation is likely to relate to chance-based in contrast to certain rewards in MRDs. This is because chance-based (vs. certain) rewards leverage the motivating effects of uncertainty for visitors and thus create larger degrees of mystery and excitement about receiving a reward to optimally appeal to visitors' sensations (e.g., King et al., 2015; Shen et al., 2019). In this vein, we do not focus on MRDs' potential to fulfil other needs, such as the anticipated experience of relatedness, because user registration is usually an individual decision made without relevant social exchanges; or the anticipated experience of autonomy, because the investigated MRDs in the context of user registration provide users with the same free choice to register and thus do not crucially differ in their potential to experience autonomy.





**FIGURE 1** Research model.

Overall, CET is well suited to providing a window into the processes through which distinct MRDs operate more or less effectively.

### 3 | RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

Building upon the theoretical rationale of CET, we argue that one and the same monetary reward in different events can motivate individuals differently. Assuming that the objective characteristics of the monetary reward (e.g., amount) and thus the extrinsic motivation remain consistent across events, different overall motivation to engage in a target activity is mainly due to variances in an individual's intrinsic motivation that result from different needs-fulfillments in different events. Accordingly, we operationalise (1) an *event* as *non-gamified* and *gamified MRDs*, whereby we also differentiate between *gamified MRDs with chance-based* and *certain rewards*, representing three of the most salient types of contemporary MRDs to motivate user registration; (2) *fulfilment of needs* as the *anticipated experience of competence* and *sensation*, reflecting the fulfilment of two crucial psychological needs for intrinsic motivation and related psychological processes underpinning the gamification- and chance-related effects of the analysed MRDs on user registration; and (3) *target activity* as *user registration*, acting as one of the most important measures for engagement and thus the successful design of MRDs.

We first argue in the main hypotheses that a visitor facing a gamified MRD with certain (H1a) or chance-based rewards (H1b) is more likely to register than when encountering a non-gamified MRD. Additionally, we suggest that a visitor encountering a gamified MRD with chance-based (vs. certain) rewards is more likely to register (H2). With these comparisons, we examine three salient MRDs and their relative direct effects on user registration, thus addressing *whether* and *how* MRDs affect user registration. Second, we develop the mediation hypotheses that shed light on the underlying mechanisms for the effects of MRDs on user registration, thereby providing a detailed perspective on the reasons that explain *why* distinct MRDs affect user registration. Specifically, we posit that anticipated experiences of competence will explain the effects of gamified MRDs with certain (H3a) and chance-based rewards (H3b) in contrast to non-gamified MRDs. Moreover, we hypothesize that anticipated experiences of sensation will explain the effects of gamified MRDs with chance-based rewards in contrast to non-gamified MRDs and gamified MRDs with certain rewards (H4). Figure 1 shows the research model.



### 3.1 | The main effects of MRDs on user registration

#### 3.1.1 | Gamified MRDs versus non-gamified MRDs

According to CET, an external event in the form of an activity and a related monetary reward must be interpreted by its functional significance (e.g., Deci et al., 1999), that is mainly by its psychological meaning for the individual and not only by its objective characteristics (e.g., the monetary value of the reward). The more the individual considers the event to function as a fulfiller of needs, the more the individual evaluates the event as intrinsically motivating (e.g., Deci et al., 1999; Deci & Ryan, 1985; Ryan & Deci, 2017). Given that the monetary reward and thus the extrinsic motivation remains the same, this intrinsic motivation will determine whether the individual engages in the target activity.

Applied to MRDs, we argue that a visitor has a higher likelihood of user registration when encountering a gamified MRD than when encountering a non-gamified MRD. A non-gamified MRD is characterised by directly providing a monetary reward for completing the user registration. Because the monetary reward is connected to such a straightforward transaction, the visitor evaluates that it is mainly offered to ensure that they will register and is less related to intrinsic motivation. In contrast, a gamified MRD objectively can offer the same monetary reward (e.g., the same financial benefit) but is also connected to playing a game. Although playing a game does not provide an objective advantage to the user in the way a higher monetary reward would (e.g., saving money on purchases), we argue that the game shapes the psychological meaning of the monetary reward. Specifically, the game can change the intrinsically motivating aspects of the monetary reward, in that the monetary reward is awarded for a specific performance in the game. Thus, it can playfully convey information about a visitor's skills—irrespective of whether the rewards in the gamified MRD are certain or chance-based. As such, we expect that gamified (vs. non-gamified) MRDs are more likely to engage visitors in user registration.

Empirical evidence corroborates this hypothesis: Studies in behavioural economics have demonstrated that the rewards' psychological meaning can change when adjusting some of the event's aspects, such as linking the reward to an individual's performance (e.g., Harackiewicz, 1979; Harackiewicz et al., 1984; Harackiewicz & Manderlink, 1984). Similarly, studies in IS research have demonstrated that performance-based gamification design elements (e.g., badges, points, leader boards) can increase user engagement in activities (e.g., Leung et al., 2022; Santhanam et al., 2016; Sheffler et al., 2020). In line with our arguments and prior empirical findings, we assert that a gamified (vs. a non-gamified) MRD—irrespective of certain or chance-based rewards in the gamified MRD—will increase the likelihood of user registration.

**Hypothesis 1a. (H1a):** A visitor is more likely to register when encountering a gamified MRD with certain rewards than when encountering a non-gamified MRD.

**Hypothesis 1b. (H1b):** A visitor is more likely to register when encountering a gamified MRD with chance-based rewards than when encountering a non-gamified MRD.

#### 3.1.2 | Certain versus chance-based rewards in gamified MRDs

Events that promote experiences of novelty, variety, and surprise can increase an individual's intrinsic motivation to engage in related events (e.g., Bagheri & Milyavskaya, 2020; González-Cutre et al., 2016; Vansteenkiste et al., 2020). In contrast, individuals can consider predictable and repetitive events dull, so they are not motivated to pursue them (e.g., O'Hanlon, 1981; Tze et al., 2016). Therefore, events that build on chance-based elements can remove the boring aspects of certainty and create diverse and exciting experiences that engage individuals (e.g., Liu et al., 2017; Malone, 1981; Shen et al., 2019).

We argue that a visitor is more likely to register when encountering a gamified MRD with chance-based rewards than a gamified MRD with certain rewards. Whereas gamified MRDs with certain rewards can only build on a performance-based simulation to engage visitors in registering on the website, gamified MRDs with chance-based rewards can additionally provide a higher sense of mystery and excitement around the monetary reward. As such, a gamified MRD with chance-based rewards leverages elements of, for example, surprise and randomness to motivate user registrations above and beyond the provision of information through in-game performance. Even though the element of chance in gamified MRDs does not provide additional objective benefits to visitors in contrast to gamified MRDs with certain rewards, visitors can evaluate that chance-based rewards are more intrinsically motivating than certain rewards. Simply stated, the chance-based reward uncertainty induces motivation on top of the motivation incited by the performance-focused activity. Accordingly, we assert that a gamified MRD with chance-based (vs. certain) rewards increases the likelihood of user registration.

**Hypothesis 2. (H2):** A visitor is more likely to register when encountering a gamified MRD with chance-based rewards than when encountering a gamified MRD with certain rewards.

## 3.2 | The mediation hypotheses via need fulfilment

As described in the main effect hypotheses, individuals cognitively evaluate an event and thus decide whether to engage in the requested target activity (e.g., Deci et al., 1999; Deci & Ryan, 1985; Ryan & Deci, 2017). The more the event signals that it can fulfil the individuals' psychological needs, the more motivated individuals are to engage in the target activity. Applied to the user registration context, the more an MRD motivates visitors, the more likely the visitors are to register. But why exactly do different MRDs motivate visitors to engage in user registration?

### 3.2.1 | The mediating role of competence

CET proposes that an event can promote an individual's fulfilment of competence; that is, the experience of effectiveness and mastery (Ryan & Deci, 2017). Accordingly, individuals can consider an event as a promoter of their skills and abilities, whereby particularly rewards can implicitly communicate feedback and thus influence an individual's experience of competence. Therefore, events that allow for the anticipated experience of competence tend to increase intrinsic motivation in the event's target activity. For example, rewards for the page-view performance of users' articles in online investor communities (i.e., affirming users' competent analyses) increased users' motivation to produce further content (e.g., Chen et al., 2019).

Based on this theoretical foundation, we argue that gamified (vs. non-gamified) MRDs will increase the anticipated experience of competence, which will translate into a higher likelihood of user registration. In the case of non-gamified MRDs, a monetary reward is conferred for entering an email address. Given this straightforward transaction, a visitor anticipates that entering an email address will not provide many experiences of competence. In contrast, a gamified MRD objectively offers a similar monetary reward (e.g., the same discount amount), but incorporates a game in which visitors need to use their skills to receive that reward. As such, the psychological meaning of the gamified (vs. non-gamified) MRDs differs. Specifically, the monetary reward not only relates to the completion of user registration but also provides positive feedback on (in-game) performance, which directly fosters the visitors' anticipated experience of competence. Given that the monetary reward in gamified MRDs is conferred for having done well, the mechanics of performance-contingent rewards require by design that an individual's skills are linked to an individual's competence. The individuals' anticipated experience of competence and related motivation is also likely to be high for gamified MRDs because performance-based game designs have challenges based on parameters (e.g., difficulty, required time) that are suitable for a large percentage of visitors (e.g., Liu et al., 2017;

Ryan & Deci, 2017). Additionally, the usually positive framing of feedback, praise, and animations (e.g., 'You can do it!' and 'You got it!') in gamified MRDs is further likely to trigger an individual's anticipated experience of competence. As such, gamified (vs. non-gamified) MRDs are more likely to signal an individual the potential experience of competence and thus motivate visitors to engage in the user registration process to make these experiences. Moreover, given that experiencing competence is linked to participating in the game, the individual's evaluation of competence-related information should be independent of whether the gamified MRD provides certain or chance-based rewards. In line with our arguments, we assert that the anticipated experience of competence works as a mediator, transferring the effects of a gamified (vs. a non-gamified) MRD on user registration.

**Hypothesis 3a. (H3a):** Competence mediates the effect of a gamified MRD with certain rewards (vs. non-gamified MRD) on user registration, such that a gamified MRD with certain rewards (vs. non-gamified MRD) has a positive indirect effect on user registration via competence.

**Hypothesis 3b. (H3b):** Competence mediates the effect of a gamified MRD with chance-based rewards (vs. non-gamified MRD) on user registration, such that a gamified MRD with chance-based-rewards (vs. non-gamified MRD) has a positive indirect effect on user registration via competence.

### 3.2.2 | The mediating role of sensation

According to CET, individuals cognitively evaluate whether an external event has the potential to fulfil their needs. Sensation, the 'need for novelty and intensity which develops ... motivational power' (Roth & Hammelstein, 2011, p. 11), has recently been added to the needs inventory and may be a need individuals care about when evaluating an event. Sensation can be stimulated through, for example, feelings of excitement, enjoyment, and pleasure, and relates to experiences of novelty, variety, or surprise (e.g., Bagheri & Milyavskaya, 2020; González-Cutre et al., 2016; Vansteenkiste et al., 2020). Applying the theoretical rationale of CET, we presume that the more an individual anticipates an experience of sensation due to an event, the more the individual is motivated to engage in the event's target activity.

We assert that gamified MRDs with chance-based (vs. certain) rewards will increase the anticipated experience of sensation, which translates into a higher likelihood of user registration. In the case of common non-gamified MRDs, visitors gain a certain monetary reward for their registration. In the event of gamified MRDs with a certain reward, the certain reward additionally depends on visitors' in-game performance. As such, the monetary reward is initially visible in both the non-gamified MRD and the gamified MRD with a certain reward. This reward-based certainty leaves little room for variety or surprise in the referral of the monetary reward, which could trigger excitement that would inform a visitor's experience of sensation. A gamified MRD with chance-based rewards, on the other hand, fulfils sensation more. Because the finally obtained chance-based monetary reward is one of many monetary rewards in a monetary reward menu, obtaining a specific monetary reward (e.g., the jackpot) is uncertain and thus out of the visitor's control, usually triggering a visitor's curiosity and excitement regarding the monetary reward (e.g., 'Will I win big?'). Moreover, gamified MRDs with chance-based rewards usually frame winning the reward in a vague and intriguing language (e.g., 'Win a reward!') and use a design that creates a large degree of mystery and excitement to optimally motivate visitors (e.g., King et al., 2015; Macey & Hamari, 2020). Consequently, visitors are likely to anticipate the experience of sensation due to potential surprise elements when revealing the monetary reward. Therefore, a visitor evaluating a gamified MRD with chance-based rewards (vs. a non-gamified MRD and a gamified MRD with certain rewards) is more likely to anticipate experiences of sensation, thus being more motivated to register. Based on this logic, we assert that the anticipated experience of sensation acts as a mediator, transferring the effect of gamified MRDs with chance-based rewards (vs. non-gamified MRDs and gamified MRDs with certain rewards) on user registration.

**Hypothesis 4. (H4):** Sensation mediates the effect of a gamified MRD with chance-based rewards (vs. a non-gamified MRD and a gamified MRD with certain rewards) on user registration, such that a gamified MRD with chance-based rewards (vs. a non-gamified MRD and a gamified MRD with certain rewards) has a positive indirect effect on user registration via sensation.

## 4 | RESEARCH METHOD

We applied a multi-method approach (e.g., Fink, 2022; Karahanna et al., 2018) and exploited the complementary properties of a randomised field experiment and a follow-up randomised online experiment to test our proposed hypotheses. We first conducted a field experiment (Study 1) on a real e-commerce website with self-involved visitors to examine the main effects of our research model (only H1a, H1b, and H2) in a setting with high ecological validity and generalizability. Subsequently, we conducted the online experiment (Study 2) to corroborate the findings of the randomised field experiment in a setting with high internal validity and to unblackbox the mediating effects of MRDs on user registration via competence and sensation (also H3a, H3b, and H4).

In the following section, we first present our research method and the design of our manipulations and experimental procedures. Subsequently, we present our study-related refinements and the results of the field (Study 1) and online experiment (Study 2).

## 5 | STUDY 1: RANDOMISED FIELD EXPERIMENT

### 5.1 | Context

We collaborated with a German fashion e-tailer, which provided us with a suitable digital environment for testing our MRDs as well as the analytical requirements (e.g., Google Analytics, Shopify) to measure visitor–website interactions and related user registrations. The website visitors were unaware of our field experiment while making real-life decisions with real information-related consequences for them and economic consequences for the e-tailer. Consequently, our data are not subject to the reporting biases inherent in survey research on information disclosure.

### 5.2 | Experimental designs and manipulations of MRDs

We employed a between-subject design with three conditions (i.e., non-gamified MRD with certain rewards; gamified MRD with certain rewards; gamified MRD with chance-based rewards) to isolate the distinct effects of our MRDs on user registration (H1a, H1b, H2). Users participated in a first-time visitor–website encounter. The landing page and related user registration system were self-designed using established Shopify (2021) functionalities. For both gamified MRD conditions, we incorporated the gamification app ‘Claw Crane: Gamified Discounts’ from the Shopify App Store (2021). This app integrates a crane game into the website, allowing a visitor to move a crane across the website and grab a ball with some specified content.

In all conditions, the user registration system asked visitors for an email address to register on the website in exchange for a monetary reward. Consistent with previous studies (e.g., Goldsmith & Amir, 2010; Mazar et al., 2017), we decided to use a discount as the monetary reward. For the design of our user registration system, we followed real-life examples (e.g., & other Stories, 2021; Clockwork Media, 2021) and previous research designs (e.g., Roethke et al., 2020). Following previous studies (e.g., Dubé et al., 2017; Tan & Chua, 2004; Wessel et al., 2019), we chose a

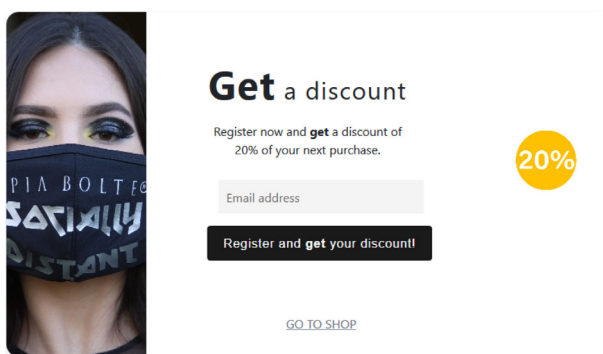
moderate (i.e., 20%) discount to avoid any potential extreme reactions (e.g., a 90% discount might be considered exaggerated because it seems ‘too good to be true’). If the visitors did not want to provide their email address, they could simply click on ‘Go to Shop,’ which was saliently displayed at the bottom of the landing page where such skip options are usually placed.

### 5.3 | Manipulations of MRDs

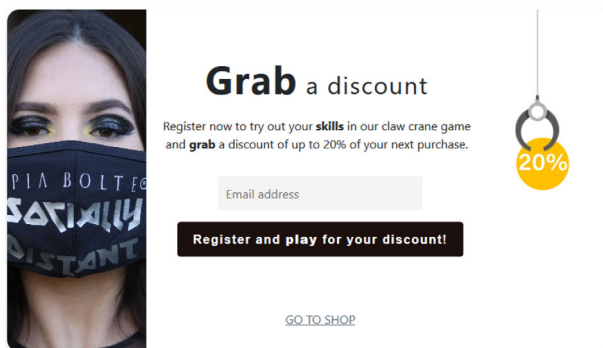
In the control condition (i.e., non-gamified MRD), the website offered a classic tit-for-tat transaction (e.g., Hann et al., 2007; Wang et al., 2020; Xu et al., 2009), in that a visitor was promised a fixed 20% discount on the next purchase for disclosing an email address and registering on the website. To clarify the certain monetary reward and fixed exchange, we used and emphasised the word ‘get’ on the website (Ryan & Deci, 2017).

For both gamified MRD conditions, the design of the user registration system differed in that we alluded to the crane game (Shopify App Store, 2021) by displaying the explicit crane on the website. We thereby signalled to visitors that there was an activity they could participate in to determine the discount amount if they decided to register on the website. Thus, we emphasised the prospect of a more responsive and sophisticated visitor–website interaction. Additionally, we adjusted the discount in that the offered 20% was now contingent on a visitor’s performance in the crane game (e.g., Shen et al., 2015; Shen et al., 2019). The design of the user registration system emphasised words related to the game, such as ‘play for your discount’ (e.g., Ryan & Deci, 2017). As such, the website informed visitors that their skills in the crane game would determine the discount by navigating the crane to catch a ball with a certain and visible reward. In the gamified MRD with chance-based rewards, the website additionally emphasised words related to a visitor’s luck; that is, ‘win’ and ‘try out your luck’ (e.g., Goldsmith & Amir, 2010; Shen et al., 2019). As such, the website informed visitors that their in-game performance would determine whether they would receive a monetary reward (i.e., ‘up to a 20% discount’) by navigating the crane to catch a ball with an unknown discount in it (i.e., indicated with a ‘?’). Figure 2 depicts the characteristics of the three experimental conditions in our paper.

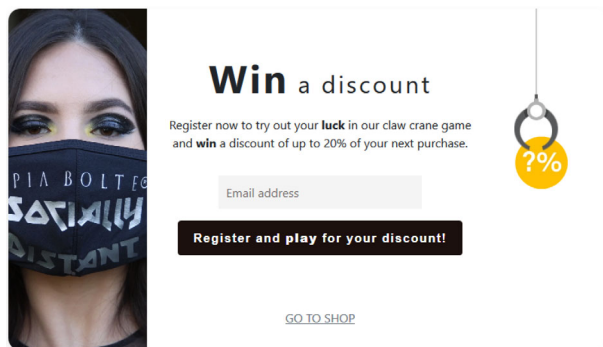
To ascertain the successful and intended manipulation of our MRDs, we conducted a pretest with 209 subjects from Amazon Mechanical Turk, employing a between-subject design for all three conditions, with a cover story similar to the task in our actual studies. Each participant saw one of the three conditions. Afterward, the participants answered questions regarding their perceptions of the website. Following established practices for manipulation checks (e.g., Hauser et al., 2018; Perdue & Summers, 1986), we employed two manipulation checks: (1) We measured the *Perceived Skill Requirement* to check for the successful manipulation of the gamified MRD because skills are central for the design of performance-based games (e.g., Liu et al., 2017; Malone, 1981) and fundamental for the evaluation and experience of perceived competence (e.g., Ryan & Deci, 2017); and (2) we measured the *Perceived Luck Requirement* to check for the successful manipulation of the gamified MRD with chance-based rewards because luck is often considered the most influencing variable in determining chance-based outcomes in gambling (e.g., King et al., 2010; Macey & Hamari, 2020) and is a common indicator for the potential to experience sensation in the form of variety and surprise (e.g., Bagheri & Milyavskaya, 2020; González-Cutre et al., 2016). Table A6 in Appendix D lists the employed items. The results of our pretest revealed that the *Perceived Skill Requirement* was higher when the gamified MRD was present ( $M = 3.57$ ;  $SD = 1.91$ ) compared to when it was absent ( $M = 2.77$ ;  $SD = 1.77$ ;  $F(1,218) = 9.34$ ;  $p < 0.01$ ). Similarly, the *Perceived Luck Requirement* was higher when the MRD with chance-based rewards was present ( $M = 4.70$ ;  $SD = 1.97$ ) than when it was absent ( $M = 3.30$ ;  $SD = 2.02$ ;  $F(1,219) = 23.80$ ;  $p < 0.001$ ). Additionally, the *Perceived Luck Requirement* was significantly higher when the gamified MRD with chance-based rewards was present ( $M = 4.70$ ;  $SD = 1.97$ ) compared to when the gamified MRD with certain rewards was present ( $M = 3.96$ ;  $SD = 1.93$ ;  $F(1,143) = 5.29$ ;  $p < 0.05$ ). These results support our assumption that the manipulations worked successfully.



Non-Gamified MRD



Gamified MRD with Certain Reward

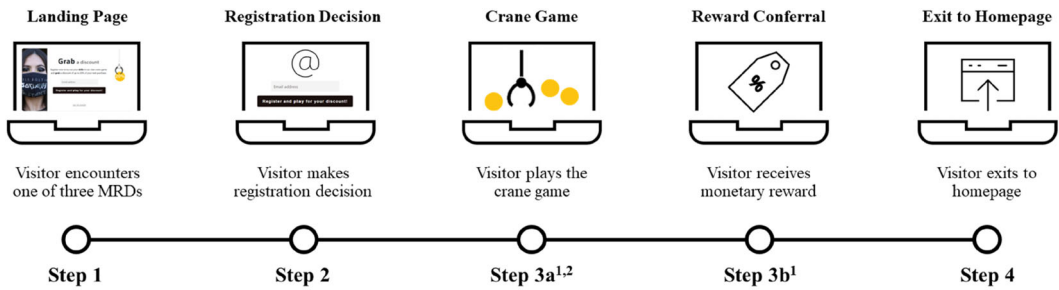


Gamified MRD with Chance-based Reward

**FIGURE 2** Experimental MRDs on the landing pages.

## 5.4 | Experimental procedure

The experimental procedure comprised four steps, as depicted in Figure 3. (1) First, a new visitor was randomly assigned to one of the three conditions of the landing page, determining which MRD they saw. This presentation of MRD was crucial, as it presented the information based on which the visitor evaluated whether to register on the website. (2) The visitor made the user registration decision. As such, the visitor had two options: They could register with a personal email address to sign up for personalised offers via email. Otherwise, the visitor left the field empty and clicked on 'Go to Shop' to go directly to the website's homepage. (3a) If the visitor registered on the website, they participated in the crane game if previously assigned to one of the gamified MRDs. (3b) The visitor received a monetary



<sup>1</sup>This step was only present if the visitor decided to register

<sup>2</sup>This step was only experienced if the visitor faced a gamified MRD with certain or chance-based rewards

**FIGURE 3** Experimental procedure of Study 1.

reward based on in-game performance in the gamified MRDs, and without playing the game in the non-gamified MRD. (4) The visitor arrived on the homepage, at which point our experiment and related data collection ended.

In sum, the visitor's user registration decision-making concluded with choosing one of the two registration options in step 2. The subsequent steps 3a/b and 4 finished the visitor's journey in the experimental setting but did not influence the previously made user registration decision.

## 5.5 | Dependent variable

We measured (*User*) *Registration Rate* as a binary variable in the form of a point estimator P:

$$P(\text{Registration Rate}) = \frac{\sum_{k=1}^n X_k}{n},$$

where  $n$  denotes the total number of unique new visitors in the respective condition who finished the visitor–website interaction (i.e., moving to the main page of the website), and  $x_k$  is a binary variable that equals 1 if the visitor enters a correct email address (i.e., pointing to an existing top-level domain) and 0 if not (i.e., clicking on 'Go to Shop').

We sent verification emails to the entered email addresses to assess the existence of the top-level domain and thus the provision of correct email addresses. We included only correct email addresses in the analyses because only correct email addresses are of value for e-tailers and can thus be considered a success indicator for the design of the user registration system.

## 5.6 | Controls

Besides the dependent variable *Registration Rate*, we also measured *Mobile Device* (i.e., whether the visitor used a mobile device to visit the website), *Organic Traffic* (i.e., whether the visitor reached the website via an organic search engine result), and *Referral Traffic* (i.e., whether the visitor reached the website via an advertised referral).

## 5.7 | Sample description

Of the 783 participants who visited the e-commerce website during our field experiment, we removed 132 (16.9%) visitors who left the website by closing the browser tab without interacting with the landing page. Thus, the final sample



comprised 651 visitors for the following analyses, of which 49 (7.5%) registered on the website. This final sample size was sufficient for the analyses, as it exceeded the minimum sample size of 277 to detect significant effects, which we calculated through a power analysis using  $G^*$  power 3.1 (Faul et al., 2007) with the following parameter specifications: three groups ( $3 \times 1$  full-factorial design), a moderate effect size, and a desired power level of 0.90 (Baroudi & Orlikowski, 1989; Cohen, 1992). Table A2 in Appendix B provides the descriptive statistics of the analysed data set.

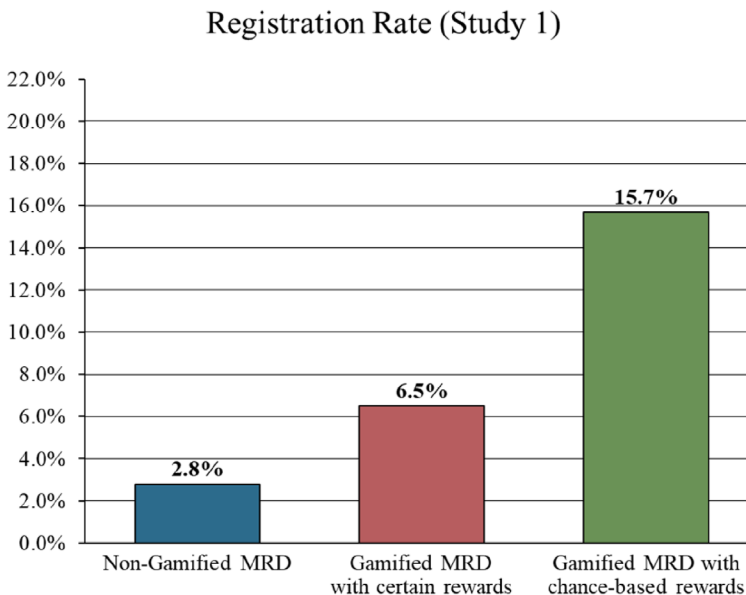
## 5.8 | Analyses and results

### 5.8.1 | Model-free results

We first report the model-free results based on mean comparisons to provide initial evidence for H1a and H1b on the differential effect of gamified (vs. non-gamified) MRDs. The one-way ANOVAs revealed that *Gamified MRD with Certain Rewards* had a significantly higher *Registration Rate* than *Non-Gamified MRD* (mean-comparison one-way ANOVA: 6.5% vs. 2.8%;  $F = 3.77$ ;  $p < 0.05$ ), supporting H1a. Additionally, *Gamified MRD with Chance-based Rewards* had a significantly higher *Registration Rate* than *Non-Gamified MRD* (mean comparison: 15.7% vs. 2.8%;  $F = 23.94$ ;  $p < 0.001$ ), supporting H1b. Figure 4 visualises the registration rates for each MRD.

### 5.8.2 | Main effect analyses

We proceeded by applying econometric models. Accordingly, we conducted binary logistic regressions on the dependent variable *Registration Rate* without and with controls (see Table 2). We examined the main effects of *Gamified MRD with Certain Rewards* and *Gamified MRD with Chance-based Rewards* and any potential effect of the controls on the *Registration Rate*. We used *Non-gamified MRD* as the baseline. The results of our regression analysis demonstrated significant positive effects of *Gamified MRD with Certain Rewards* ( $b = 0.93$ ; *Wald statistic* (1) = 3.5;  $p < 0.1$ ) and *Gamified MRD with Chance-based Rewards* ( $b = 1.87$ ; *Wald statistic* (1) = 17.3;  $p < 0.001$ ) on *Registration Rate*.



**FIGURE 4** Registration rates for each MRD (Study 1).

Hence, in the *Gamified MRD with Certain Rewards* condition, participants were 141% more likely to register than participants in the *Non-gamified MRD* condition, further supporting H1a. Moreover, participants encountering the *Gamified MRD with Chance-based Rewards* were 544% more likely to register than participants encountering the *Non-Gamified MRD*, further supporting H1b.

We conducted a Wald test to further analyse the main effects of the two gamified MRDs on the registration rate (Wooldridge, 2010). Specifically, we tested whether the regression coefficients of the *Gamified MRD with Certain Rewards* and *Gamified MRD with Chance-based Rewards* were equal. The result yielded a significant difference regarding the effect of *Gamified MRD with Certain Rewards* and *Gamified MRD with Chance-based Rewards* on the *Registration Rate* (Wald statistic (1) = 7.5;  $p < 0.001$ ). Because the regression coefficients of *Gamified MRD with Chance-based Rewards* were significantly greater than the corresponding coefficients of *Gamified MRD with Chance-based Rewards*, we concluded that the former had a significantly larger impact on *Registration Rate*, further supporting H2.

## 6 | STUDY 2: RANDOMISED ONLINE EXPERIMENT

### 6.1 | Purpose and methods

Our randomised field experiment in Study 1 was characterised by high ecological validity thanks to both the real-life context in which MRDs were practically applied and the sample of self-involved visitors. Yet, the study was constrained in terms of internal validity. Moreover, we could not explore the underlying psychological processes that result in user registrations. We addressed these limitations in Study 2, corroborating the high external validity of the first study within a controlled online experiment with high internal validity, in addition to elucidating the causal relationships and exploring the underlying mechanisms (including controls) that explain the direct effects. Thus, we could triangulate how our findings regarding core theoretical relationships (i.e., the effects of MRDs on the registration rate) converged or diverged across the studies. Furthermore, we could reduce the likelihood that the observed main effects of Study 1 are spurious, thus increasing the reliability of our conclusions.

**TABLE 2** Binary logistic regression analyses on registration rate.

Construct	Model 1			Model 2		
	Coefficient	SE	Exp(B)	Coefficient	SE	Exp(B)
Intercept	-3.54***	0.38	0.07	-2.71***	0.40	0.07
Manipulations						
Gamified MRD with chance-based reward	1.86***	0.44	6.44	1.87***	0.45	6.47
Gamified MRD with certain reward	0.88*	0.47	2.41	0.93*	0.48	2.45
Controls						
Mobile device	-	-	-	-2.15***	0.39	0.11
Organic traffic	-	-	-	0.61	0.70	1.84
Referral traffic	-	-	-	0.11	1.10	1.11
Model fit						
Log likelihood	-162.11	-	-	-141.18	-	-
Nagelkerke $R^2$	0.09	-	-	0.23	-	-
Omnibus model $\chi^2$	324.21***	-	-	282.36***	-	-

Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ;  $N = 651$ ; manipulations are dummy coded as binary variables; non-gamified MRD as baseline.

Study 2 is similar to Study 1 in its experimental design, the design of the MRDs, and the dependent variable. As such, we created a website and MRDs according to the characteristics and context of the website and MRDs in Study 1. Study 2 mainly differed from Study 1 regarding some aspects of the experimental procedure (i.e., the invitation and the post-experimental questionnaire) and the measured variables (i.e., the mediators, controls, and attention checks). The following sections will present the details of these differences.

## 6.2 | Experimental procedure

To collect sample data comparable to Study 1, we applied convenient sampling via social media of common, predominantly German e-commerce visitors and users (Etikan et al., 2016). Participants were informed that a fashion e-tailer startup required feedback on its website appearance and that they were requested to test and evaluate the website design. Moreover, we informed participants that the website interaction could stop at any time and that any action on the website, such as providing their information (e.g., email address), was voluntary and could be used by the startup for website services. Similar to Study 1, we randomly assigned participants to one of three MRD conditions that were identical to the conditions in Study 1. Subsequently, participants underwent an experimental procedure similar to steps 1–2 in Study 1, in that participants saw the assigned MRD and could voluntarily provide an email address to receive personalised offers. In addition to steps 1 and 2 taken in Study 1, however, participants took a different path after finishing step 2, as depicted in Figure 5: After their user registration decision, they were asked to fill out a questionnaire including the measures for our mediators, demographics, and controls. They were also told that the experiment would stop once they answered the questionnaire, given that all relevant variables had been measured at this point. As such, they would not experience the game or the reward within the experimental setting. Still, after the survey, participants could exit to the respective real website, where they could play the game if they wanted (Step 4a–c).

In sum, similar to Study 1, the visitor's user registration decision-making concluded with choosing one of the two registration options in step 2. The subsequent step 3 gathered information for mediators, demographics, and controls. Steps 4a–c are provided to illustrate the optional finish of a visitor's journey in the experimental setting—yet, similar to the final steps in Study 1, the final steps in Study 2 did not influence the previously made registration decision or other previously measured variables.

## 6.3 | Mediator variables and controls

We drew on established items for our mediators of *Competence* (Sheldon et al., 2001) and *Sensation* (Deng & Poole, 2010; Sheldon et al., 2001). We also collected data for demographics (i.e., participants' *Age* and *Gender*) and control variables from the extant literature that we considered most relevant to increase the robustness of our findings.

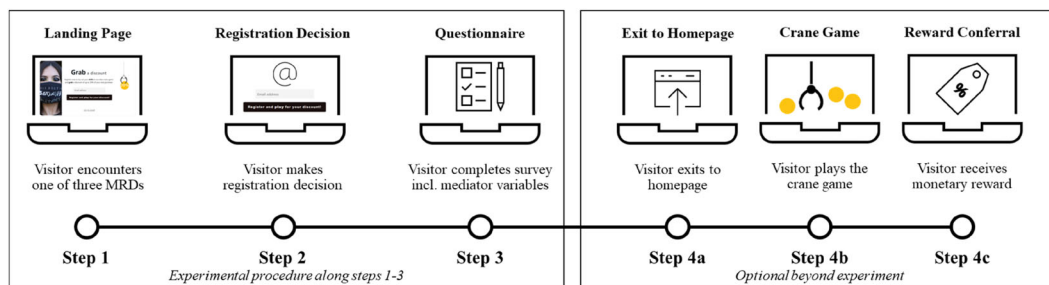


FIGURE 5 Experimental procedure of Study 2.

We measured *Autonomy* (Sheldon et al., 2001) to show that the effects are not dependent on the participants' experiences of regulation and volition through the game, thus demonstrating the effects' robustness even when accounting for another need beyond competence and sensation.<sup>3</sup> Additionally, we measured *Perceived Value* (Kim & Kankanhalli, 2009) to account for potentially different valuations of the offered monetary reward due to their design-related certainty (i.e., '20%') or uncertainty (i.e., 'up to 20%') (e.g., Goldsmith & Amir, 2010; Mobley et al., 1988).

## 6.4 | Sample description

Of the 438 participants who visited the website, we removed 108 participants (24.7%) who failed one attention check (i.e., 'Please select strongly disagree'). Thus, the final sample comprised 330 participants for the following analyses, of which 61 (18.5%) registered on the website (see Table A5 in Appendix D for descriptive statistics of the analysed data set). Again, this final sample size exceeded the minimum sample size of 277 to detect significant effects (Baroudi & Orlikowski, 1989; Cohen, 1992; Faul et al., 2007).

We conducted several F-tests regarding the distributional properties to confirm the successful randomised assignment of the participants to the different website designs. Statistically insignificant differences between the three experimental groups (all  $p > 0.1$ ) indicated successful randomisation.

Furthermore, we conducted a confirmatory factor analysis using varimax rotation (Fornell & Larcker, 1981) to assess the psychometric properties of the measurement models. We found evidence for adequate convergent and discriminant validities (see Table A5 and A6 in Appendix D). Additionally, the average variances extracted (AVEs) were above the threshold of 0.50 for convergent validity. In addition, the square roots of the AVEs were greater than correlations between the corresponding constructs, providing evidence for discriminant validity (Fornell & Larcker, 1981). We assessed internal consistency through Cronbach's alpha and composite reliability, which were greater than the threshold value of 0.70 for all constructs. Lastly, we tested for common method bias using Harman's single-factor test (Bagozzi et al., 1991; Podsakoff et al., 2003) and a full collinearity test (Kock, 2015), concluding that common method bias does not confound the statistical findings (see Appendix E).

## 6.5 | Analyses and results

### 6.5.1 | Model-free results

Again, we first report the model-free results based on the mean comparison. The one-way ANOVAs again provide initial support for H1a and H1b, in that participants facing a *Gamified MRD with Certain Rewards* were more likely to register than participants facing a *Non-Gamified MRD* (mean-comparison one-way ANOVA: 18.3% vs. 10.2%;  $F = 2.97$ ;  $p < 0.1$ ), supporting H1a. Additionally, participants facing a *Gamified MRD with Chance-based Rewards* were more likely to register than participants facing a *Non-Gamified MRD* (mean comparison: 26.5% vs. 10.2%;  $F = 10.15$ ;  $p < 0.01$ ), supporting H1b. Figure 6 provides the registration rates for each MRD condition.

### 6.5.2 | Main effects

We conducted binary logistic regressions on *Registration Rate* without and with controls (see Table 3). We computed Adjusted/Nagelkerke's  $R^2$  and  $\chi^2$ /F-Test statistics to test the fit of our models. The results of model 1 demonstrate

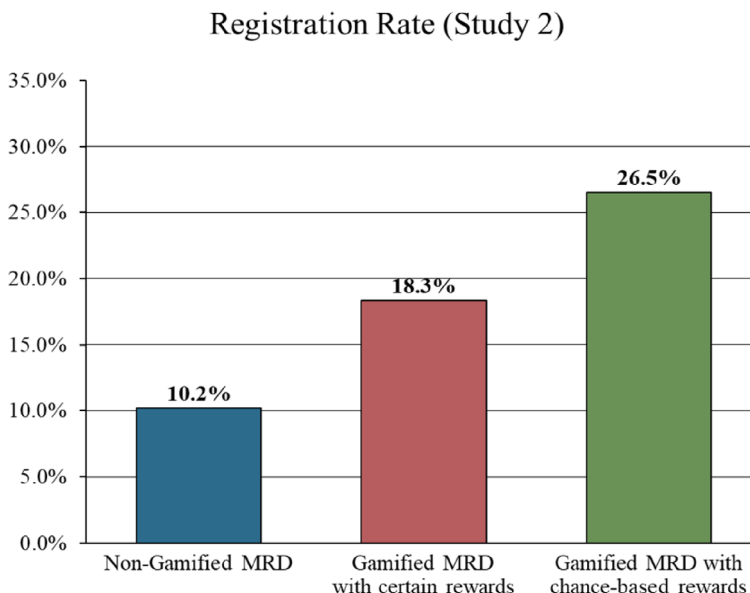
<sup>3</sup>We did not measure relatedness as a further control, as the context of MRDs for user registrations usually does not provide opportunities for social interactions or exchanges, providing little theoretical basis for changes in this need. Moreover, relatedness is rarely investigated in studies drawing on CET (e.g., Deci & Ryan, 1985; Ryan & Deci, 2017).

the significant positive main effects of *Gamified MRD with Certain Rewards* ( $b = 0.73$ ; Wald statistic (1) = 3.14;  $p < 0.1$ ) and *Gamified MRD with Chance-based Rewards* ( $b = 1.27$ ; Wald statistic (1) = 10.22;  $p < 0.01$ ) on *Registration Rate*. Hence, when facing a *Gamified MRD with Certain Rewards*, participants were 98% more likely to register than participants facing a *Non-Gamified MRD*, supporting H1a. Additionally, participants facing a *Gamified MRD with Chance-based Rewards* were 219% more likely to register than participants facing a *Non-Gamified MRD*, supporting H1b. These effects are robust when we entered the controls in model 2.

To analyse H2, we conducted a Wald test (Wooldridge, 2010) on whether the regression coefficients of the *Gamified MRD with Certain Rewards* and *Gamified MRD with Chance-based Rewards* are significantly different. The results yield that the regression coefficient of the *Gamified MRD with Chance-based Rewards* was greater than the corresponding coefficient of *Gamified MRD with Certain Rewards* (Wald statistic (1) = 2.8;  $p < 0.1$ ), supporting H2. Taken together, the results from the main effect analyses in Study 2 corroborate Study 1's findings.

### 6.5.3 | Mediation effects

In H3a and H3b, we argued that competence mediates the effects of both gamified MRDs on user registration. We used PROCESS (Hayes, 2022, model 4) to examine these mediation hypotheses. To investigate the process driving the effect of *Gamified MRD with Certain Rewards* on *Registration Rate*, we entered *Competence* and *Sensation* as mediators between the respective independent and dependent variables, along with *Gamified MRD with Chance-based Rewards* and control variables as covariates. As depicted in Figure 7, the indirect effect of *Gamified MRD with Certain Rewards* through *Competence* on *Registration Rate* was statistically significant (indirect effect = 0.38; standard error = 0.17; 95% confidence interval (CI) = [0.14, 0.78]), in support of H3a. In contrast, the indirect effect of *Gamified MRD with Certain Rewards* through *Sensation* on *Registration Rate* was not statistically significant (indirect effect = 0.10; standard error = 0.08; 95% CI = [-0.02, 0.29]). Moreover, the significant direct effect of *Gamified MRD with Certain Rewards* on *Registration Rate* in the base model (direct effect = 0.73; standard error = 0.41; 90% CI = [0.07, 1.43]) became insignificant in the mediation model (direct effect = 0.20; standard error = 0.43; 90% CI = [-0.51, 0.92]), indicating full mediation via the only significant mediator *Competence* (e.g., Zhao et al., 2010).

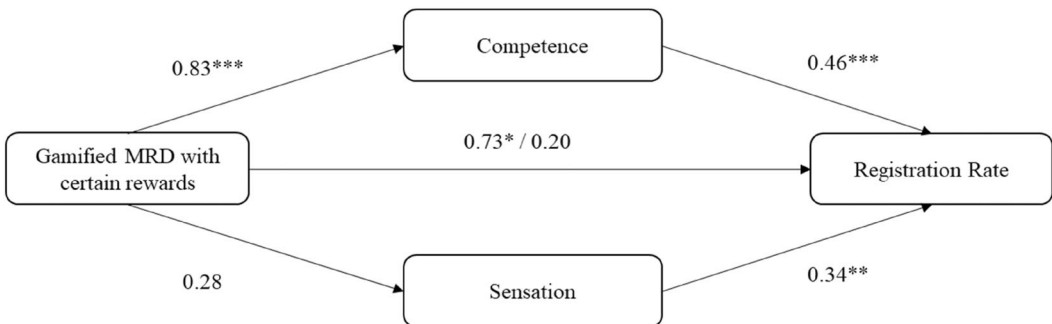


**FIGURE 6** Registration rates for each MRD (Study 2).

**TABLE 3** Binary logistic regression analyses on registration rate.

Construct	Model 1			Model 2		
	Coefficient	SE	Exp(B)	Coefficient	SE	Exp(B)
Intercept	-2.18***	0.32	0.11	-4.64***	0.73	0.01
Manipulations						
Gamified MRD with Chance-based Rewards	1.16***	0.38	3.19	1.27***	0.40	3.56
Gamified MRD with Certain Rewards	0.68*	0.40	1.98	0.73*	0.41	2.08
Control Variables						
Autonomy	-	-	-	0.14	0.12	1.15
Perceived Value	-	-	-	0.39***	0.13	1.48
Gender (male)	-	-	-	0.15	0.31	1.16
Age	-	-	-	0.03	0.32	1.03
Model Fit						
Log likelihood	-152.90	-	-	-143.11	-	-
Adjusted/Nagelkerke $R^2$	0.05	-	-	0.14	-	-
Omnibus model $\chi^2$ /F-test	305.79***	-	-	286.22***	-	-

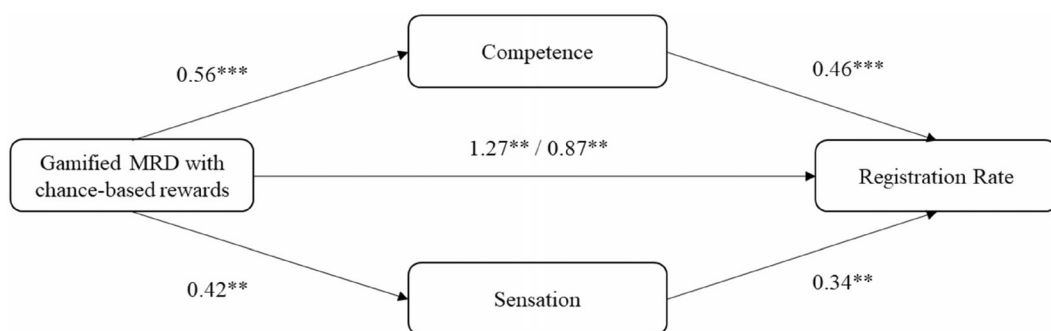
Note: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ ;  $N = 330$ ; manipulations are dummy coded as binary variables; non-gamified MRD as baseline.



Note: The first coefficient on a given path represents the direct effect without the mediators in the model; the second represents the direct effect when the mediators are included in the model. Coefficients were computed using bootstrapping with 20,000 samples (Hayes 2022). All controls as well as manipulations were included in the analyses. Manipulations are dummy coded as binary variables.  
\*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

**FIGURE 7** Mediation results for the gamified MRD with certain rewards.

**H3b** and **H4** proposed that the effect of *Gamified MRD with Chance-based Rewards* on *Registration Rate* is mediated via *Competence* and *Sensation*. To test these hypotheses, we again performed mediation analyses using PROCESS (Hayes, 2022, model 4). We entered *Competence* and *Sensation* as mediators, *Gamified MRD with Chance-based Rewards* as the independent variable, and *Registration Rate* as the dependent variable in our mediation model, along with *Gamified MRD with Certain Rewards* and control variables as covariates. As depicted in Figure 8, the indirect effect of *Gamified MRD with Chance-based Rewards* through *Competence* on *Registration Rate* was statistically significant (indirect effect = 0.26; standard error = 0.14; 95% CI = [0.06, 0.58]), in support of **H3b**. Likewise, the indirect effect of *Gamified MRD with Chance-based Rewards* through *Sensation* on *Registration Rate* was statistically significant



Note: The first coefficient on a given path represents the direct effect without the mediators in the model; the second represents the direct effect when the mediators are included in the model. Coefficients were computed using bootstrapping with 20,000 samples (Hayes 2022). All controls as well as manipulations were included in the analyses. Manipulations are dummy coded as binary variables.  
 $*p < 0.1$ ;  $**p < 0.05$ ;  $***p < 0.01$

**FIGURE 8** Mediation results for the gamified MRD with chance-based rewards.

(indirect effect = 0.14; standard error = 0.10; 95% CI = [0.01, 0.38]). In sum, our results show that *Gamified MRD with Chance-based Rewards* had a positive indirect effect on *Registration Rate* via *Sensation*, supporting H4. Furthermore, the significant direct effect of *Gamified MRD with Chance-based Rewards* on *User Registration* in the base model (direct effect = 1.27; standard error = 0.40; 90% CI = [0.67, 1.98]) stayed significant in the mediation model (direct effect = 0.87; standard error = 0.41; 90% CI = [0.21, 1.56]), indicating partial mediation via the two significant mediators *Competence* and *Sensation* (e.g., Zhao et al., 2010).

## 7 | DISCUSSION

Should e-tailers employ gamified MRDs to achieve a higher likelihood of user registration, and if so, why? We address this question and provide insights that support the assertion that gamified (vs. non-gamified) MRDs have differential effects on user registrations. Specifically, gamified MRDs and particularly gamified MRDs with chance-based (vs. certain) rewards are more likely to drive user registrations than non-gamified MRDs. Additionally, we demonstrate that MRDs indirectly affect user registration via anticipated experiences of competence and sensation.

### 7.1 | Contributions to research

Our paper provides two main contributions to IS research on MRDs (e.g., Hann et al., 2007; Qiao et al., 2021). First, we advance prior research by increasing our understanding of the differential effects of distinct MRDs on engaging visitors. Previous IS research has mainly treated MRDs as a monolithic block and has largely ignored the differential effects of distinct salient types of MRDs, hence focusing on the presence versus absence of monetary rewards and on certain-reward-for-completed-target-activity exchanges (e.g., Hann et al., 2007; Roethke et al., 2020; Wang et al., 2020). Despite their valuable insights, these studies neglected important facets of MRDs, which resulted in a rather simple understanding of MRDs. Yet, visitors may respond differently to the same monetary rewards if the MRDs employ different mechanics for the visitor–website interaction and conferral of rewards, leaving researchers and e-tailers with a vague impression of the effectiveness of MRDs. Our paper extends this research by investigating the differential effects of distinct types of MRDs, particularly focusing on the role of in-game performance in conjunction with chance-based (vs. certain) monetary rewards. Our findings that gamified MRDs and particularly



gamified MRDs with chance-based (vs. certain) rewards achieve more user registrations than non-gamified MRDs illuminate differential effects that theoretically advance the IT artefact. Thus, we provide researchers with a more nuanced understanding of how they can implement gamification in MRDs. Given that the gamified MRD with chance-based rewards was the most effective MRD in our research, our results also underscore the importance of considering chance-based reward design as an extended form of gamification. These findings indicate an opportunity to realise untapped potential to increase user engagement and pave the way for more innovative and successful gam(b)lified MRDs. Overall, we contribute to a more holistic picture of MRDs by shifting the perspective on MRDs from *what* is offered to *how* visitors gain monetary rewards. These insights are important because they help researchers understand that MRDs and their effectiveness comprise monetary rewards and the mechanics through which visitors receive them.

Second, this paper addresses an important gap in understanding the underlying explanatory psychological processes of *why* MRDs engage visitors. Although previous studies have examined the direct effects of monetary rewards on user information disclosures on websites (e.g., Hann et al., 2007; Hui et al., 2007), the effect mechanisms that explain the reasons for MRDs motivating visitors to engage in such target activities have remained largely unexplored. By proposing competence and sensation as two important psychological needs that MRDs can promote to varying extents, we unblackbox the psychological processes of MRDs and thereby provide a hitherto missing theoretical explanation for *why* MRDs engage visitors. Thus, we provide initial evidence toward a more comprehensive understanding of the processes that make gamified MRDs and specifically gamified MRDs with chance-based rewards successful. These insights enable not only to build a stronger theory, but also to predict engagement better and elevate the impact of the MRDs.

## 7.2 | Practical implications

Our findings regarding the MRDs engaging visitors have important practical implications for e-tailers, particularly those who rely on user registrations.

First, for e-tailers who intend to employ monetary rewards, our paper provides useful and actionable guidelines on the employment of gamified MRDs to engage visitors and specifically to increase user registration beyond non-gamified MRDs. Most resources on designing MRDs provide rather general descriptions (e.g., Hann et al., 2007; Roethke et al., 2020; Xu et al., 2009) that are not contemporary enough to cover current dynamics regarding the emergence and development of gamified MRDs. This paper is one of the first to provide e-tailers with valuable insights into the effectiveness of employing different MRDs to engage visitors. Given that the application of gamification is still in development, it is valuable to explore various emerging MRD options to motivate visitors to register more. We suggest that gamification combined with chance-based design elements (in contrast to many other website design elements) are particularly apt to increase visitor motivation toward target activities and are thus most likely to engage visitors. Accordingly, e-tailers are well advised to rethink how their websites can employ the new possibilities of gamification to better, for example, catch attention, increase visitor–website interactions, and/or guide and animate visitors. Our paper encourages e-tailers to gamify their websites and specifically include more reward-related uncertainty than giving visitors a plain monetary reward. Altogether, this research suggests that e-tailers can influence visitor motivation by structuring website encounters to appear more gamified instead of being completely transactional to visitors. Though we found gamified MRDs with chance-based rewards to be most effective, we acknowledge that certain conditions may limit the feasibility of these MRDs in practice. For example, e-tailers may prefer to offer only one monetary reward instead of organising and managing a menu of various monetary rewards, which are required for chance-based rewards in gamified MRDs. In those settings, we recommend gamified MRDs with certain rewards instead of chance-based rewards.

Second, and more broadly, just as gamification has emerged in several domains and forms, gamified MRDs promise to be more useful and effective than their non-gamified counterparts across various applications. Moreover, we revealed that significantly more visitors registered when encountering a gamified MRD with chance-based rewards

compared to a gamified MRD with certain rewards. However, the lessons are likely not to be restricted to e-commerce settings and may be applied to rewards in general, thereby motivating user behaviours in various other domains (e.g., training and learning) and activities (e.g., website user surveys), in which non-gamified MRDs are still the status quo. In this regard, gamified MRDs, particularly those with chance-based rewards, may be attractive alternatives for many organisations that rely on visitor motivation and related engagement.

### 7.3 | Strengths, limitations, and directions for future research

The present paper has various strengths, including the combination of a randomised field experiment and a randomised online experiment, insights from visitors' actual engagement, and the unblackboxing of the psychological processes underlying the effects of the three investigated MRDs on user registration. Particularly through our multi-method approach, we could provide both internally and ecologically valid findings that are more robust and more comprehensive than findings from applying only one method. However, our research also has some limitations, providing interesting future research directions.

First, to keep our research model focused, the paper investigated three salient types of MRD. Although these types are some of the most common ones in e-commerce and can be easily applied by various e-tailers (e.g., KPMG, 2019), future research can explore adjustments to and variations in our experimental designs, such as (1) different monetary rewards: different options for monetary rewards, different values of monetary rewards (e.g., the amount), different kinds of rewards (e.g., consolation prizes), different likelihoods of chance-based rewards (e.g., low, moderate, high), other non-monetary rewards with emotional and/or social value (e.g., badges and positions on leaderboards), different non-task-related rewards (e.g., documentary and progress-related rewards), multiple rewards (e.g., for several target activities); and (2) changes in the game design: different games (e.g., puzzle, word, and arcade games), changes in the determination of performance (e.g., number of points given), explication of performance (e.g., congratulation messages), and target activities before versus after the game (e.g., requesting the visitor to register after playing the game). As a result of these variations, worthwhile research endeavours comprise analysing the related consequences for fulfilling needs (e.g., experiences of competence and sensation) and achieving target activities related to engagement (e.g., user registration). Additionally, future research could explore other measures for engagement (e.g., visit duration, return visits, reviews) and the long-term outcomes beyond mere user registration (e.g., sales, net promoter scores, review generation). Lastly, given our focus on gamified MRDs with certain or chance-based rewards versus non-gamified MRDs with certain rewards, we did not investigate non-gamified MRDs with chance-based rewards. As such, future research can shed more light on this specific type of MRDs and its design variations (e.g., monetary amounts) and consequences (e.g., user experiences, effectiveness).

Second, we conducted our research in e-commerce, a context with high relevance and broad applicability. Even though it is likely that the results apply to many other contexts related to e-commerce, generalizability beyond the e-commerce context needs exploration. For instance, future studies could examine MRDs in organisational applications and learning management systems, investigating whether gamified MRDs with certain or chance-based rewards are worthwhile in achieving the desired target activities in these contexts. Moreover, we encourage exploring potential differences in visitor dispositions (e.g., playfulness, risk-seeking tendencies) as well as cultural aspects (e.g., cultural acceptance of chance-based rewards). Therefore, we call for future research to replicate our findings in other contexts, explore boundary conditions, and look more into participants' characteristics.

## 8 | CONCLUSION

E-tailers are increasingly rethinking how to engage their visitors. Thanks to recent technological advances, gamified MRDs are increasingly employed and promise to engage visitors more. Yet, research on these novel forms of MRDs

is still developing. Drawing on cognitive evaluation theory, we explain the effects of three salient MRDs on user registration. By combining the complementary properties of a randomised field experiment and a randomised online experiment, we empirically demonstrate that a visitor encountering a gamified MRD, and particularly a gamified MRD with chance-based rewards, is more likely to become a registered user than when encountering a non-gamified MRD. Moreover, MRDs have distinct indirect effects on user registration via anticipated experiences of competence and sensation. Overall, this paper provides impetus to design more engaging MRDs with gamification.

## CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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## DATA AVAILABILITY STATEMENT

Data subject to third party restrictions: The data that support the findings of this study were partly delivered from our cooperating partner. Restrictions apply to the availability of these data.

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