

Promoting Sustainable Consumer Behavior in E-commerce: An Empirical Study on the Influence of Gamification on Consumers' Return Motivation

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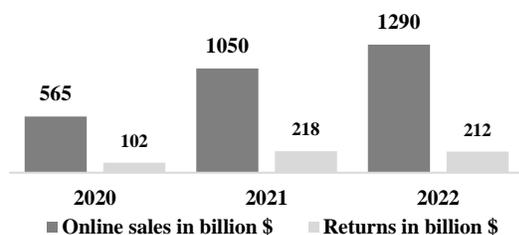
Abstract

An increasing number of product returns accompanies growing e-commerce sales, and is a major burden for companies but also for the environment. This paper analyzes the effect of gamification on return motivation (RM) and purchase motivation (PM). Drawing on self-determination theory by Deci & Ryan (1985), we designed a consumer-centric gamification scenario to investigate whether gamification can influence return motivation in terms of sustainability. Furthermore, we elaborate participants' autonomy (A), competence (C), and relatedness (R) need satisfaction through gamification. A survey-based online experiment with online shoppers from the U.S. (n=973) is analyzed using a structural equation model (SEM). Among other results, we show that gamification has a strong direct effect on return motivation. We conclude that gamification acts as extrinsic motivation. Our results indicate that gamification is a promising tool to sensitize consumers for sustainable online shopping behavior.

Keywords: e-commerce, sustainability, product return management, gamification, consumer behavior

1. Introduction

E-commerce sales have been growing rapidly over the past few years (Ahsan & Rahman, 2022; Ambilkar et al., 2022). In the U.S., for instance, e-commerce sales more than doubled between 2020 and 2022, increasing from US\$565 billion to US\$1.29 trillion (see Figure 1). However, the success and rise of e-commerce also has a



Source: ApprissRetail 2023
Figure 1. Online sales and returns

dark side for online retailers (known as e-tailers), society, and the environment: product returns. In the U.S. alone, the total amount of retail returns from online sales was US\$212 billion in 2022 (see Figure 1). This represents 16.5% of total e-commerce sales. The negative consequences of product returns are obvious. From a company's perspective, consumer returns are a major cost driver and pose a threat to profitability (e.g. Duong et al., 2022). Returns represent lost sales and significantly increase costs in retailers' supply chains (Röllecke et al., 2018). In addition to lower profit margins, high costs for returns can force companies to increase product prices (Asdecker, 2015), which may have a negative impact on social welfare (Hsiao & Chen, 2012). It is also important to note that online product returns have strong negative environmental impacts (Chaleshtari et al., 2022). Product returns increase pollution through their carbon footprint and additional waste (Tian & Sarkis, 2022). In the U.S., an estimated 24 million metric tons of carbon dioxide were generated by product returns in 2022. In addition, it is estimated that returned goods generate 9.5 billion pounds of landfill waste per year (Optoro, 2022). It is clear that each product returned inevitably has an environmental cost; in general, the lower the number of products returned, the greater the environmental sustainability (Cullinane et al., 2019).

Because online returns have so many negative consequences, reducing the volume of returns would help online retailers reduce the cost of returns, maintain competitiveness and make e-commerce more environmentally friendly (Martínez-López et al., 2022). Although e-tailers would certainly prefer to avoid returns and have often adopted restrictive return policies in the past, they are aware that consumer-friendly return policies and processes increase sales and promote customer loyalty (Wang et al., 2019). As a result, many e-tailers simply accept high return rates as part of their consumer-friendly, lenient return policies (Janakiraman et al., 2016). To meet the requirements of sustainable development, it is therefore essential to manage product returns in a way that both reduces environmental impact and ensures companies' competitiveness. An important

approach that helps to achieve both objectives is to prevent returns before they actually occur. In this study, we analyze whether gamification is suitable to influence consumers' return motivation in terms of sustainability.

Gamification is generally defined as the use of game elements in nongame contexts (Deterding et al., 2011) with the aim of creating experiences similar to those in games (e.g., fun, satisfaction, motivation) and influencing behavior (Hamari et al., 2014; Huotari & Hamari, 2012). Gamification has been applied in education, learning and health (e.g. Tobon et al., 2020). It also seems to be a promising way to influence the motivation for environmentally friendly behavior or sustainable consumption (Douglas & Brauer, 2021; Guillen et al., 2021; Hsu & Chen, 2021; Pasini et al., 2017). Moreover, gamification applications are used in e-commerce to enhance brand engagement (e.g. Vitkauskaitė & Gatautis, 2018) or to make online shopping entertaining and promote consumer purchase intention (Gao & Wu, 2022; García-Jurado et al., 2021). Azmi et al. (2021) conclude that gamification positively affects consumers and businesses in several ways, including behavioral improvement, encouragement, engagement, purchase intention, and loyalty to an e-tailer.

While gamification in e-commerce has been extensively studied, the potential use of gamification to influence return motivation, particularly in terms of sustainability, has received limited research attention. Therefore, our main research question (RQ) is:

RQ: *Can gamification influence return motivation in terms of sustainability and thus reduce returns?*

In this context, we not only address the question whether gamification works. Based on the self-determination theory (SDT), we also analyze if potential effects on consumers' return behavior are rather intrinsically or rather extrinsically motivated. We first classify gamification in preventive return management. After presenting the relevant literature on gamification in e-tailing, we develop the hypotheses drawing on SDT by Deci & Ryan (1985). Subsequently, we present a survey-based online experiment of online shoppers from the U.S. (n=973) and calculate the structural equation model (SEM) based on the assumed hypotheses. We conclude with a discussion, limitations and outlook.

2. Return management in e-tailing

Return management in general includes all measures, strategies, and process designs that focus on reducing the cost or volume of product returns (Röllecke et al., 2018). Effective return management must take into account the reasons for returns: (1) the product is damaged, (2) the wrong product was delivered, (3) the product is not the right size, color, etc., (4) the customer

does not like the product (anymore), (5) the customer ordered several alternatives to choose from (e.g., different dress sizes or colors), or (6) it was an impulse purchase, and the customer now regrets the purchase (Ambilkar et al., 2022; Pei & Paswan, 2018).

The first two reasons are typical logistics-related reasons for returns, i.e., they are related to poor logistics performance. This includes late deliveries if the customer no longer needs the goods or has found a better price or product (Powers & Jack, 2015). Reasons (3) and (4) are consumer satisfaction-related reasons for returns. After receiving the goods, customers compare their personal expectations regarding, for example, appearance and quality with reality and evaluate the goods. The buyer returns the product if his or her expectations are not met (Martínez-López et al., 2022; Powers & Jack, 2015). Behavior-related reasons for returns include (5) and (6). In addition to selection orders and parallel orders (i.e., the same products are ordered from different retailers), the return of used, nondefective goods is one of the behavior-related reasons for return. In this case, a consumer-friendly, lenient return policy is fraudulently exploited when, for example, a dress is ordered for a specific occasion (e.g., a wedding party) and then returned.

While return management generally includes effective and efficient return processing, preventive return management addresses return prevention or avoidance. Therefore, preventive return management comprises all measures and instruments used by e-tailers to prevent or avoid returns prior to purchase, during the purchase process, and after purchase (Brand & Kopplin, 2023). A possible categorization of existing instruments can be found in our digital appendix. However, although many online retailers already use various preventive measures (e.g., zoomable detailed item images, product videos or customer reviews), return rates (i.e., returns in relation to sales) in e-commerce have not decreased significantly in recent decades. For this reason, further innovative approaches are needed to reduce the amount of returns. We investigate gamification as a potential instrument for preventive return management.

3. Gamification in e-tailing

A general and widely accepted definition of gamification is “the use of game design elements in non-game contexts” (Deterding et al., 2011, p. 9). In contrast to ordinary games, gamification applications are designed to include only elements from games and do not create a complete game by themselves (Furdu et al., 2017). Seaborn & Fels (2015, p. 27) state accordingly, “[G]amified systems are game-like, but not a game.” The goal of gamification is to increase participants' motivation by adding game elements to encourage users

to engage in certain behaviors, thereby creating a significant driving effect to induce desired user behaviors (Barata et al., 2017; Hamari et al., 2014). It can be concluded that gamification acts as an incentive instrument based on ludic techniques. Common gamification elements include points, scores, leaderboards, progress bars, rewards, or incentives, all of which occur frequently in gamification applications (Armstrong & Landers, 2018; Landers et al., 2015; Sailer et al., 2017; Seaborn & Fels, 2015). Gamification is therefore also referred to as a "points, badges, and leaderboard" method (Vesa & Harviainen, 2019). In the context of e-commerce, the following definition was given by Lounis et al. (2013, p. 201): "Gamification is the process of game-thinking and game-mechanics to engage the consumer in the nongaming context of shopping in order to drive engagement and enhance the process of behavioral shift."

In most cases, online retailers use gamification primarily as a reward for loyalty and to increase customer retention. In their extensive literature reviews, Behl et al. (2020) and Tobon et al. (2020) show that gamification is an emerging concept in e-commerce that can boost customer loyalty, motivation, engagement, and fun. E-tailers use various elements that can range from simple bonus points and sweepstakes entries to complex leaderboards and awards. Several empirical studies showed positive effects of gamification elements such as reward points, badges, leaderboards, statuses, and levels on online shoppers' behavior and attitudes (e.g. Azmi et al., 2021; Rahmadhan et al., 2023). Gamification elements implemented on e-tailer websites have the potential to increase users' trust in an online seller, motivate online shoppers to use a brand more often than usual, and increase purchase intent. Aparicio et al. (2012) show that gamification affects positively the use of e-commerce platforms and usage in turn positively influences repurchase intention. Aghdaie et al. (2022), Matthew et al. (2021) and Mominzada et al. (2021) show a relationship between gamification, customer satisfaction and repurchase intention in e-commerce. Sitthipon et al. (2022) conclude that gamification can be one of the effective strategies to increase repurchase intention in e-commerce by improving customer satisfaction. In the context of returns in e-commerce, only Lopes et al. (2023) indicated based on consumer interviews that gamification can correct undesired consumer behavior such as returns. Although the effects of applying gamification in e-commerce have been researched extensively, to the best of our knowledge there is no quantitative study on the influence of gamification on online shoppers' return motivation.

4. Methodology

4.1. Theoretical foundation and hypothesis development

To influence behavior, it is important to understand what drives individuals to behave in certain ways (e.g., return a product purchased online). This paper builds on the psychology of human motivation, especially the well-recognized SDT by Deci & Ryan (1985). This theory is extensively used to explain the effect of gamification on motivation and behavior (Shi & Cristea, 2016; Xi & Hamari, 2019). Moreover, SDT is commonly used to explain sustainable behavior (Darner, 2009, 2012; Wang et al., 2021) and consumer behavior in e-commerce (Tandon & Ertz, 2022; Widyarini & Gunawan, 2018). Therefore, it is reasonable to use SDT to explain sustainable consumer behavior in e-commerce triggered by gamification.

Richter et al. (2015) provide a broad overview of relevant theories regarding motivation and gamification. The authors highlight SDT as a comprehensive theory, since it addresses a continuum of distinct types of motivation. The core tenet of SDT is the focus on types rather than amount of motivation, ranging from intrinsic to extrinsic motivation (Ryan & Deci, 2000). Intrinsically motivated activities are those that a person finds interesting and that are performed without any conditions solely because of the sheer pleasure of the activity (e.g., achievement of personally relevant goals). SDT states that individuals are intrinsically motivated to perform a certain behavior when the three basic psychological needs are satisfied (Ryan & Deci, 2000): (1) need for competence, e.g., feedback on performance, (2) need for autonomy, e.g., perceived decision freedom, and (3) need for relatedness, e.g., sense of meaning and feeling of belonging. A behavior is considered self-determined and intrinsically motivated when it is used to achieve individual goals. Therefore, self-determined behavior occurs even in the absence of extrinsic incentives or restrictions. Accordingly, a self-determined, sustainable lifestyle that is characterized by performing environmentally protective behaviors is temporally persistent (Pelletier & Sharp, 2008).

Gamification can modify the context through specific game elements and thereby induce motivational mechanisms (Alsawaier, 2018; Shi & Cristea, 2016). The existing gamification literature shows that games are usually fun and engaging and are therefore intrinsically motivating (Deterding et al., 2011; Huotari & Hamari, 2012; Shi & Cristea, 2016; Yang et al., 2017). An important and interesting discussion in this context concerns the relationship between extrinsic rewards (e.g., points, levels, and badges) and intrinsic motivation. Richter et al. (2015) state that game

elements like leaderboards, badges, and levels can support the need for status, recognition, and prestige, as well as competence and mastery. Therefore, gamification can enhance feelings of competence and thus increase intrinsic motivation (Aparicio et al., 2012; Jung et al., 2010). Sailer et al. (2017) also show that badges and leaderboards support the satisfaction of the need for competence and the need for autonomy, while avatars and meaningful stories foster the satisfaction of the need for social relatedness. However, other studies show neutral or negative effects of gamification on intrinsic motivation (Hanus & Fox, 2015; Lieberoth, 2015). In their meta-analysis, Deci et al. (1999) state that anticipated tangible extrinsic rewards (e.g., points in our case) significantly diminish intrinsic motivation. This implies that the reward system commonly used in gamification may be detrimental to intrinsic motivation.

The effect of motivational stimuli depends on individual and contextual factors. Specifically, autonomy and competence can be countervailed by contextual conditions, such as imposed goals (Ryan & Deci, 2000). However, extrinsic rewards do not necessarily undermine people's intrinsic motivation (Cerasoli et al., 2014). The effects of extrinsic rewards on intrinsic motivation are mediated by a person's perception of these events as informative or controlling (Ryan & Deci, 2000). Individuals who perceive extrinsic rewards as informative rather than controlling experience higher competence need satisfaction (Vansteenkiste et al., 2010). In contrast, individuals who perceive extrinsic rewards as pressures experience lower feelings of autonomy (Mekler et al., 2017). Therefore, game elements can have different effects on motivation: they may enhance either intrinsic motivation through the experience of competence or decrease intrinsic motivation if perceived as controlling (Dahlström, 2012; Richter et al., 2015).

In any case, the implementation of game elements modifies online shipping and product return experiences and may affect autonomy (A), competence (C) and relatedness (R) need satisfaction. Formulating our first hypothesis we follow Sailer et al. (2017) and assume that the game elements used in our experiment (i.e., points, badges, and levels) foster these three basic psychological needs:

H1: *Gamification satisfies the needs for (a) autonomy, (b) competence and (c) relatedness and thereby decreases return motivation (RM).*

However, we may have to reject this hypothesis if the extrinsic rewards in our case primarily act as extrinsic motivation and do not foster intrinsic motivation. Regardless of this, gamification is a goal-oriented system using rewards such as points to incentivize behavior. Thereby, gamification may act as an extrinsic motivator and directly affect RM. As

Shepperd (2001) illustrates in expectancy value theory, game elements have the potential to change individual's efforts to attain rewards. Accordingly, consumers may alter their thoughts or behavior because of the reward process (e.g. Anderson et al., 2013). Hence, we assume the following:

H2: *Gamification directly decreases RM.*

Despite the high processing costs and low recycling value of returns, retailers often apply a lenient return policy. Behind these policies lies the belief that lenient handling encourages the purchase of products more than returns (Janakiraman et al., 2016). Correspondingly, the opposite appears to be the case for restrictive return policies. Imposing penalties on customers who return a product causes negative emotions. For example, if a product does not meet the consumer's expectations, the resulting negative emotions compound those associated with the return. In anticipation of negative emotions, the customer then refrains from ordering anything at all to avoid this double negative experience (Gelbrich et al., 2017). Changes in return policies are therefore associated with risks and challenges for the e-tailer. Consumers accustomed to lenient policies may react negatively when confronted with changes toward more restrictive return options (Janakiraman et al., 2016). Accordingly, we hypothesize the following:

H3: *Gamification satisfies the needs for (a) autonomy, (b) competence and (c) relatedness and thereby decreases purchase motivation (PM).*

H4: *Gamification directly decreases PM.*

The research model in Figure 2 shows the presumed hypotheses examined in this study.

4.2. Research design

The experiment was set up as follows. At the beginning of the survey, participants were assigned to one of two experimental groups. Respondents were then presented with different shopping scenarios based on their group (see the scenarios and our questionnaire in our digital appendix). Participants were asked to imagine that they wanted to buy a product on a

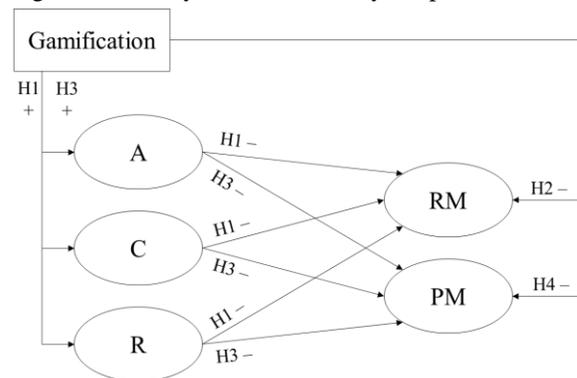


Figure 2. Research model

simulated website called Fashionstore24.com. In addition, they should assume this website was already familiar to them. Then, they were introduced to the concept of the Fashionstore24.com “Member Club”. While the control group (CG) only saw the general terms and conditions (free shipping and returns, 100-days return policy), the gamification group (GG) received additional information. In the GG, the Member Club was set up with different game elements: (1) points (positive for each product customers kept and negative for each product they returned), (2) different levels, status, and badges, (3) profile options, (4) leaderboards and (5) rewards (additional points). Werbach & Hunter (2015) categorize game elements hierarchically into three categories: components, mechanics, and dynamics. Components represent the specific characteristics (e.g., points), while mechanics drive the engagement e.g., through rewards. Game dynamics are the overarching elements that define the patterns of how the game and players will develop over time. For example, levels (components) give the user feedback (mechanics) and thus convey a sense of progress (dynamics). Based on existing literature (e.g. Karra et al., 2019; Richter et al., 2015; Vitkauskaitė & Gatautis, 2018), Table 1 shows a summary of game elements used within the Member Club and how they apply to the SDT core elements.

After being presented with one of the two scenarios, the respondents were asked about their sociodemographic data, their PM and RM as well as their feelings on their A, C, and R need satisfaction. Finally, a realism check was conducted where respondents were asked whether the presented scenario was realistic. All questions were answered using a seven-point Likert scale (1 = “strongly disagree” to 7 = “strongly agree”). All constructs were measured using established scales from prior literature, which were carefully adapted to our experimental context.

4.3. Data collection and sample characteristics

To examine the research questions and hypotheses, we conducted an online experiment with U.S. citizen via

Table 1. Game elements used within the scenario

SDT core elements	Game elements		
	Components	Mechanics	Dynamics
Autonomy	Scenario, level, status, profile, meaningful tasks	Reward	Progress, emotions
Competence	Level, status, points, badges, leaderboard, mission, and challenges	Reward, competition	Progress, emotions
Relatedness	Badges, profile	Sharing	Progress, emotions, relationships

the research platform “Prolific”. To ensure the comprehensibility and logic of the questionnaire, a pretest of the experimental setting was conducted beforehand. The final survey took place from May to June 2023 and resulted in 992 completed questionnaires. As part of the data cleansing process, respondents who finished the questionnaire too quickly or answered control or attention test questions incorrectly were excluded from further data analysis. As a result, the final sample consisted of 973 completed questionnaires. Table 2 provides an overview of the sociodemographic data of the total sample and the two groups.

On average, respondents from the CG indicated that they shop online slightly more frequently compared to respondents from the GG ($p = 0.002$). This could potentially be a bias. A regression of the shopping frequency against RM and PM reveals a significant correlation for PM ($\beta_{PM} = .164, p < 0.001$). It is not surprising that individuals, who shop online more frequently, on average, display a higher PM. This should be kept in mind when reading our analysis. However, since the CG orders only slightly more often than the GG, this confounding effect can be neglected in the grand scheme of things. Before proceeding with the results of the SEM, we note that the results of the realism check for the two scenarios showed that the participants thought the scenarios presented were realistic. The neutral midpoint of the Likert scale was 4, while the maximum was 7 (“strongly agree” that the scenario was realistic). The average answer in the CG was 5.65, and the average answer in the GG was 4.92. Both averages are significantly higher than the scale midpoint (t -test, $p < 0.001$).

4.4. Validity and reliability assessment

Next, validity and reliability were assessed for the model. We performed an exploratory factor analysis (EFA) to extract and validate the most important independent factors. The results of the EFA indicated

Table 2. Sociodemographic data of the sample

	Total	CG	GG
<i>n</i> =	973 (100%)	493 (50.7%)	480 (49.3%)
<i>Gender</i>			
Male	48.2%	48.5%	47.9%
Female	49.4%	49.7%	49.2%
Nonbinary	2.4%	1.8%	2.9%
<i>Average age</i>	37.97 years	38.46 years	37.47 years
<i>Education</i>			
High school degree	36.0%	32.7%	39.4%
Bachelor's degree	41.0%	44.6%	37.3%
Master's degree	12.7%	12.2%	13.3%
Other	10.3%	10.5%	9.9%
<i>Online shopping frequency</i>			
Weekly	25.9%	27.6%	24.2%
Every two weeks	26.0%	30.2%	21.7%
Monthly	35.6%	31.6%	39.6%
Quarterly or less	12.6%	10.5%	14.6%

that each item loaded on its respective underlying concept, and all loadings were significant for both the CG and the GG. We followed recommendations from the EFA literature to make appropriate selections for our analysis (e.g. Conway & Huffcutt, 2003; Guadagnoli & Velicer, 1988). Specifically, we used the maximum likelihood method with oblique rotation (*direct oblimin*). Oblique rotation was applied based on the suspected correlations between A, C, R, RM and PM. According to Guadagnoli & Velicer (1988), the factor structure can be interpreted in a generalized manner if at least four variables load above .60 on one factor. In the course of EFA “RM I” was excluded due to cross-loadings (< .60) on two factors. After re-running, the EFA, “A II” was excluded due to loading (.55). The EFA resulted in a five-factor solution with 21 variables. The Kaiser-Meyer-Olkin measure of sampling adequacy was .945, representing a marvelous factor analysis (Field, 2013), and Bartlett’s test of sphericity was significant ($p < .001$; see digital appendix). We assessed convergent validity through average variance extracted (AVE). Composite reliability (CR) and Cronbach’s alpha were calculated to assess internal consistency. To view validity and reliability assessment of the model, see Table 3.

4.5. Model fit statistics

To test the research model, we used a structural equation model (SEM) to analyze the collected data. SEM allows for the simultaneous evaluation of both the measurement model and the structural model. The analysis was conducted using SPSS AMOS version 29. The assessment of normality showed a failure to exhibit

multivariate normal distribution. Therefore, we used bootstrapping with a 95 % confidence interval. The model fit indices suggested that the measurement model was a good fit to the data: $\chi^2 = 942.79$, $df = 195$, $p = .000$, indicating a reasonable fit ($\chi^2/df \leq 5$) according to Kline (2016). The comparative fit index [CFI] = .964 and Tucker Lewis index [TLI] = .958 showed an excellent fit ($\geq .95$; West et al., 2012). Fabrigar et al. (1999) suggest that root mean square error of approximation [RMSEA] values $\leq .05$ are good, and values between .05 and .08 are acceptable. Accordingly, our [RMSEA] = .063 is acceptable. For the standardized root mean square residual [SRMR], Diamantopoulos & Siguaw (2000) indicate that values $\leq .05$ are acceptable. Therefore, our model, [SRMR] = .048, has an acceptable fit.

5. Results and discussion

The SEM results show significant coefficients for the paths from gamification (G) to RM and PM at $p \leq .01$. Both paths show negative regression coefficients (β) indicating that gamification directly leads to a reduction in RM ($\beta_{G \rightarrow RM} = -.972$) and PM ($\beta_{G \rightarrow PM} = -.186$), whereas the reduction in RM is higher. Accordingly, H2 and H4 can be accepted.

Paths from G to A and C are significant (.01) and negative ($\beta_{G \rightarrow A} = -.550$; $\beta_{G \rightarrow C} = -.431$), whereas G to R is not significant. Therefore, contrary to our hypothesized relationship, our gamification scenario leads to a reduction of autonomy and competence need satisfaction. The coefficients for the paths from A and R to RM are significant and positive ($\beta_{A \rightarrow RM} = .116$; $p = .01$; $\beta_{R \rightarrow RM} = .127$; $p = .02$), while the path from C to RM is not significant. The results indicate that gamification leads to a reduction in return motivation through reducing autonomy need satisfaction. Moreover, gamification reduced competence need satisfaction significantly, but competence does not significantly affect return motivation. Gamification has no significant influence on relatedness need satisfaction, but relatedness need satisfaction significantly increases return motivation. Hence, we reject H1a, H1b and H1c.

Analysing the results for H3 shows significant paths to PM coming from A ($\beta_{A \rightarrow PM} = .455$; $p = .02$), C ($\beta_{C \rightarrow PM} = .259$; $p \leq .01$) and R ($\beta_{R \rightarrow PM} = .175$; $p \leq .01$). However, since the paths from G to A and C are significantly negative and the path to R is not significant, H3a, H3b and H3c are rejected.

Figure 3 shows the SEM results, with significant paths and coefficients in bold (see additional statistical calculations, such as cross tables for each construct in our digital appendix). Only A and C were found to be significant mediators for the relationship between G and RM/PM. We also conducted a moderation analysis for

Table 3. Validity and reliability of the model

Variables	Item	Loadings	Cronbach's α	CR	AVE
Return Motivation	RM I	omitted	0.920	0.917	0.736
	RM II	.717			
	RM III	.902			
	RM IV	.926			
	RM V	.871			
Purchase Motivation	PM I	.828	0.966	0.952	0.798
	PM II	.876			
	PM III	.955			
	PM IV	.964			
	PM V	.834			
Autonomy	A I	.602	0.874	0.804	0.508
	A II	omitted			
	A III	.767			
	A IV	.764			
	A V	.706			
Competence	C I	-.856	0.907	0.872	0.633
	C II	-.885			
	C III	-.633			
	C IV	-.785			
Relatedness	R I	.848	0.935	0.914	0.727
	R II	.730			
	R III	.897			
	R IV	.923			

the relationships A, C, R to RM/PM with the moderator being gamification (G). Some significant moderations exist. The correlations C to RM and A to PM were found to be significantly weaker in the GG, while the correlation R to RM was found to be significantly stronger in the GG. However, these moderations do not change the core findings of this study.

In contrast to our hypotheses, results show that our gamification scenario reduces autonomy and competence need satisfaction. This agrees with results from Deci et al. (1999) and may be because the scenario is perceived as controlling and restrictive due to the framing of the Member Club and hence thwart autonomy (Dahlström, 2012). Since autonomy need satisfaction has a positive effect on return motivation, gamification still decreases return motivation through less autonomy need satisfaction. Further, individuals may feel less competent because of the new rules in the Member Club. Potentially, competence need satisfaction may increase over time as participants become more familiar with the rules. In our case, no significant influence of gamification on relatedness need satisfaction was found. This might be because participants do not yet identify as a “full” member of the Fashionstore24.com Member Club. This could also change over time as individuals become more involved. However, consistent with our hypotheses, results show a very high negative direct influence from gamification on return motivation. This indicates that gamification directly effects return motivation and acts as an extrinsic motivation. Gamification can target both intrinsic and extrinsic motivation. In certain contexts, extrinsic rewards may be more effective in changing behavior, while intrinsic motivation may be more effective in other contexts (Landers et al. 2015). Therefore, extrinsic motivation should not generally be considered weaker than intrinsic motivation. In our gamification scenario, the extrinsic rewards (points, badges, and levels) seem to have an extrinsic effect, at least in the short-term. This extrinsic motivation may be internalized over time and

could thereby influence behavior in the long-term (Ryan & Deci, 2000). This would occur over time if participants increasingly perceive the extrinsic rewards as informative rather than controlling. To achieve this internalization of extrinsic motivation, individuals must be exposed to the gamification application for an extended period.

Gamification is a promising measure to raise awareness of the impact of returns, as customers experience a direct connection to their personal return behavior through extrinsic rewards. In line with literature on preventive measures and our hypothesis, gamification also has a direct negative effect on purchase motivation (Gelbrich et al., 2017). Gamification is therefore a double-edged sword, which on the one hand reduces return motivation but on the other hand also reduces purchase motivation.

6. Conclusion, limitations, and outlook

This study stands out as the first to examine a customer-centric approach of gamification in preventive return management. The results of this study show the potential of gamification and may serve as a starting point for future research. Specifically, it is crucial to consider situational and contextual factors when using gamification methods. The framing of our survey may have influenced the outcome of our study. The scenario was not a repeated game, which is why we can only assume potential long-term effects. In addition, we applied a combination of game elements such as points, badges, and levels. Therefore, the effect of the individual elements is not clear. Some studies already evaluated isolated game elements to understand their distinct effects (e.g. Anderson et al., 2013; Richter et al., 2018). Nevertheless, additional research is required in the field of return management. It is important to emphasize that gamification in preventive return management is a double-edged sword, affecting both the return motivation and purchase motivation. Another potential problem to consider is the temporal effectiveness of gamification, as it tends to yield results only in the short term. However, long-term effects can be achieved through the internalization of extrinsic motivation. Consequently, special attention should be paid to the design of such an approach. In our study, the complexity of the gamification scenario may have hindered its ability to foster intrinsic motivation. Employing a simpler and more easily accessible design holds the potential to achieve better and more long-term effects. Additionally, it is important to mention that a change in motivation does not immediately result in a corresponding change in behavior. As Geng et al. (2017) show, there are several reasons for this so-called motivation-behavior gap. Their results show, in the

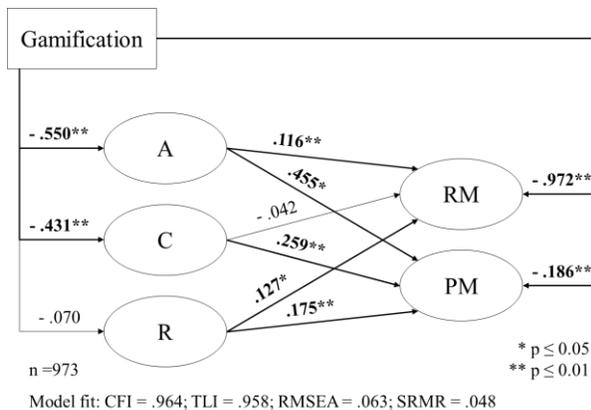


Figure 3. SEM results

context of travel behavior, that environmentally friendly motivation is a necessary but not sufficient condition to ensure stable sustainable behavior. The motives of economy, convenience, and comfort would adjust, disturb, or may even change behavior, resulting in a motivation-behavior gap.

Despite the existing limitations and newly emerging research questions, our findings provide a compelling indication of a promising approach addressing the issue of high return rates in e-commerce. To advance scientific understanding in this field, future studies could evaluate the influence of demographic characteristics (e.g., age or gender) and include other regions such as Asia and Europe. In addition, upcoming research could examine the effect of individualized consumer-centric return policies. The utilization of gamification can facilitate the implementation of these customized policies. In addition, the impact of gamification on purchase motivation needs further investigation. Obviously, the decrease in returns affects behavioral reasons for buying and returning, such as ordering multiple alternatives, impulse buying, or taking advantage of lenient return policies. If primarily these reasons are affected, it need not necessarily be detrimental to companies if the number of such orders declines. However, if other reasons are affected, the introduction of a more lenient policy would have to be considered. It is even possible that consumer satisfaction-related reasons are affected if the motivation not to return a product is stronger than dissatisfaction, e.g., with the color of an item. Many return management instruments affect the phases before and during the purchase (Brand & Kopplin, 2023). With our gamification approach, we present an instrument that is applicable to all purchase phases, including the post-purchase stage. Furthermore, it could be analyzed how consumers can be sensitized for sustainable shopping behavior through gamification to strengthen a more sustainable e-commerce.

Gamification is a consumer-centric approach with the potential to reduce return motivation and mitigate the associated challenges faced by companies and the environment. As gamification is still in its early stages in the context of preventive return management, it remains to see how e-tailers will establish this approach to address their high return rates in the future.

7. Link to our digital appendix

[dx.doi.org/10.6084/m9.figshare.23522955](https://doi.org/10.6084/m9.figshare.23522955)

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