

# Increasing donation intentions toward endangered species: an empirical study on the mediating role of psychological and technological elements of VR

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## Abstract

Virtual reality (VR) as a communication tool is increasingly gaining attention in various contexts, including the promotion of fundraising and donation-based activities. Recent academic literature tends to focus on VR as a valuable tool for human-human donation, with little consideration of the human-animal donation context. Furthermore, the use of key flagship species can encourage donations for the specific animal and provide broader conservation and economic benefits, including encouraging tourism and visitor spending. However, work needs to explore VR as a tool for flagship species donation versus other forms of communication tools and the impact this could have on broader conservation goals. Two studies were conducted to investigate VR in a human-animal donation context using two modalities (VR and static advertisement). Study 1 investigates the mediating role of psychological elements: empathy and enjoyment, while Study 2 examines the mediating role of technological elements of VR: usability and telepresence. We found that VR increases enjoyment and engagement with the flagship species, increasing the likelihood of donating. VR also increases telepresence, and the usability of the VR tool positively affects donors' likelihood to donate. Our findings inform a future research agenda to consider VR in a donation context further.

Keywords: *virtual reality, donation, flagship species, advertising*

## 1. Introduction

Virtual Reality (VR), deemed to be a new, more complex form of communication (Ulrich, 2015), has been proposed for use in the context of fundraising and donations (Kandaurova & Lee, 2019). Bowman et al. (1999) contend that the main hope for VR is its application in useful contexts to benefit people. It is possible to define VR in terms of human experience, describing telepresence as the “experience in an environment by means of a communication medium” (Steuer, 1992, p. 78). VR acts as a useful tool providing a manipulatable and navigable space where communication takes place (Schroder, 1996) and has been used in several ways, including as a virtual site or world (e.g., Huang et al., 2016) or

with augmented glasses (e.g., Guttentag, 2010). Increasingly, there has been consideration of the use of VR as a tool to encourage fundraising and donations. While studies have examined the use of VR in the donation environment, there is a need to understand better its potential for use given the currently fragmented literature on the topic. The majority of studies conducted thus far have investigated human-human donation, yet further consideration of the potential for VR in a human-animal donation context is needed.

VR technology has transpired in disciplines such as social marketing (Dietrich et al., 2019), health (Shin et al., 2015), education (Pantelidis, 2010), and information systems (Lv & Li, 2015). Based on all these studies through various contexts, it suggests that VR is an effective tool in achieving both communications and marketing goals and has the potential to fulfill nonprofit goals such as fundraising efforts. Though the use of VR is mainly to enhance interactivity, studies suggest that the benefits of using VR are beyond its mechanical elements; it is a complex construct that emphasizes the importance of user presence, exploration of nature, and characteristics of user experience (Schuemie et al., 2001). Prior studies indicated VR can promote more favorable brand attitudes because it is more context-focused (Hilken et al., 2021). Thus, VR's ability to realistically replicate actual consumer experiences is dependent on its context (Boyd & Koles, 2019). Therefore, we seek to present a review of VR research, highlighting their findings, offering a new theoretical perspective of VR usage in a donation context, and providing future research directions.

Furthermore, we offer managerial implications for organizations considering the use of VR in their marketing efforts and how VR can be an essential communication tool, especially in the donation context (e.g., human-to-animal). VR can be considered the leading edge of a general evolution of communication interfaces whose main characteristic is the full immersion of the human sensorimotor channels into a vivid and global communication experience. This interaction could be a carrier for eliciting emotional support and makes it

possible for VR users to change their personal identity (Riva, 1999; Van Kerrebroeck et al., 2017a).

We begin by introducing a discussion on the usage of charismatic species in a non-human donation context and the conceptualization of VR in the charitable giving context using the theoretical lens of TpB. Following this, we present two studies evaluating the use of VR in non-human donations, thus illustrating these findings in a new context. Last, this study presents the scope for future research considering both non-human donations and the use of VR in charitable giving.

### **1.1 Charitable giving and VR**

Charitable giving is an important prosocial behavior (Urbonavicius et al., 2019) primarily driven by charities and nonprofit organizations to fundraise contributions to support important causes (Wallace et al., 2017). The sharing of personal property is a driving change that can positively influence society (Kim & Han, 2020). However, data from 126 nations have shown a decrease in donations from ‘superpower’ countries over ten years (2009-2018; e.g., US, Canada, UK, Netherlands; Kim & Han, 2020). There is a need to encourage and attract donors, and marketing campaigns are an important tool to influence the success of a fundraising drive (Burt, 2012). Previous marketing studies have considered giving in a variety of contexts, including volunteerism (Fisher & Ackerman, 1998), organ and blood donations (Bagozzi, 1981, 1982; Burnkrant & Page Jr, 1982; Hu et al., 2017; LaTour & Manrai, 1989; Pessemier et al., 1977), fundraising promotion (Bagozzi & Moore, 1994; Meyers-Levy & Maheswaran, 1992), and compliance techniques (Fraser et al., 1988; Moore et al., 1985; Reingen, 1978). However, Caviola et al. (2019) asserted that prosociality towards animals, in the context of charitable donations, is different from that of humans. As such, we propose the exploration of non-human donations.

In line with this, there is a need to understand the different types of media content available and the impact on willingness to donate (Shreedhar & Mourato, 2019). While some work has considered technological advancements within the field of charitable donations, with a focus on social media (e.g., Wallace et al., 2017), there has been little consideration of VR (see Table 1).

-----Insert Table 1 Here-----

VR offers a new medium for marketing communication. It can immerse consumers into technologically synthesized ‘real’ experiences of products and services and take users to locations in the real world. Wagler and Hanus (2018) compared a tour via a two-dimensional (2D) video, an immersive 360° video using a VR headset, and individuals physically walking around the grounds of the designated location. They found that 2D viewing conditions scored low on all measures relative to spatial presence, emotional engagement, and preferences. However, individuals who were physically on-site or those who had the 360° video condition did not have any differences, suggesting those who experienced the 360° video have the same or similar spatial presence, emotional engagement, and preferences as those who did were physically present. Thus, 360° video tourism may be a strong analog to a real-world experience. Kandaurova and Lee (2019) add that in a donation context, VR increases social presence, which in turn increases empathy and social responsibility. Therefore, it instigates a higher intention to donate money or volunteer time.

While perceived as a new tool (Ulrich, 2015), discussions around the concept of VR have been evident for decades (e.g., Steuer, 1992; Sutherland, 1970). Earlier definitions of VR centered on the device rather than the user experience. Steuer (1992, p. 76) criticized such early definitions and conceptualized VR as “a real or simulated environment in which a perceived experiences telepresence”. Telepresence, an important element of VR, influences consumer attitude as it builds on media richness and user control attained through VR use

(Kandaurova & Lee, 2019) versus more traditional media. The media richness, and ultimately simulated effect of VR, lends itself to developing a more natural environment, thus enhancing the usability of the technology (Schnack et al., 2019) versus more traditional media, such as static advertisements. The superior media effects of VR also generate enjoyment (Yoo & Drumwright, 2017), which mediates usage of the technology and user intention (Li & Chen, 2019; Rauschnabel, 2018) and has the opportunity to enhance empathy. VR enhances empathy (Schutte & Stilinovic, 2017), ultimately linking to the use of empathy in prosocial behavior such as donations (Jolliffe & Farrington, 2006; Kandaurova & Lee, 2019). As such, we propose that the key elements of VR, including telepresence, usability, enjoyment, and empathy, provide advantages for the use of VR over other traditional media formats when seeking to increase donation attitude and behavior.

While used in a range of fields, including tourism (Huang et al., 2016), education (Hu-Au & Lee, 2017; Kavanagh et al., 2017), clinical research (Li et al., 2017), and pandemic responses (Singh et al., 2020), there has been little consideration of VR in nonprofit fundraising (see Kandaurova & Lee, 2019; Yoo & Drumwright, 2018). UNICEF used VR technologies in 2015 to raise much-needed funds for Syrian refugees (Kang, 2016) by seeking to close the gap between the social and emotional (Yoo & Drumwright, 2018). Other charitable organizations, such as the United Nations and Amnesty International, have sought to enhance social responsibility and spread awareness of social issues through VR (Kandaurova & Lee, 2019). Thus, VR offers exciting opportunities and potential when considering how best to increase donations (Yoo & Drumwright, 2018).

It is interesting to draw more fine-grained distinctions between the donation recipients (e.g., animals). Donations toward animals are still limited (3% of all donations) compared to donations toward humankind and disasters (Giving USA, 2018). The overarching purpose of this paper is to explore the use of VR when considering fundraising in a human-animal

donation context. Organizations striving to increase fundraising in an animal or conservation context commonly tell a narrative around the need to conserve a particular species using audio-visual promotional activities (Shreedhar & Mourato, 2019). Theoretically and practically, there is a need to consider the different attitudes toward flagship species versus broader conservation and the role of VR.

Previous studies have explored donations meant for humans, such as those begging on the streets or during recovery from natural disasters (Lay et al., 2020), in line with earlier human-focused studies on empathy (Hills, 1995). While there has been little consideration of creating empathy for non-human subjects when using VR, there are conflicting perspectives in the literature (Nelson et al., 2020; Ramirez, 2017). Previous work has shown a positive correlation between empathy for animals and humane behavior toward them (Broida et al., 1993; Eisenberg, 1988; Hills, 1995).

Nelson et al.'s (2019) study on conservation donation found that those exposed to the 360° VR film felt a significantly higher sense of presence than those in the classic video treatment. They found that the further the person lives from the coast, which is the area that needs conservation, the higher the donation amounts. Therefore, when an environment is “out of reach” and potential donors are exposed to these areas via VR technology, it is reasonable to argue that they will feel more telepresence and have a higher likelihood of donating. Grondin et al. (2019) argue that the richer the media (e.g., virtual reality), the greater empathy. In addition, Skadberg and Kimmel (2004) found support for the relationship between enjoyment and telepresence as variables affecting flow in the human-computer interaction.

Kristofferson et al. (2022) found that VR generated significantly higher donations when compared to a traditional 2D advertisement, which indicates that VR appeals can elicit increased donations. However, between donations to humans and animals, their results show

that the donation amounts toward the animal, when compared to humans, are less. Furthermore, they found that the feelings of physical presence (i.e., reduced physical distance) with the endangered species did not mediate the relationship between media type and donations. Thus, it suggests that other underlying mechanisms could be operating in this charitable appeal context. This underlying mechanism indicates that the immersive experience contributes to the charitable appeal. Theoretically and practically, there is a need to consider the different attitudes to flagship species versus broader conservation and the role of VR.

## **1.2 Charismatic Flagship Species**

According to the International Union for Conservation of Nature Red List of endangered species (IUCN, 2018), there is a steep increase in the number of species listed as Critically Endangered or Endangered. This increase is a threat to a global biodiversity conservation. The use of charismatic, or flagship, species to encourage donation behavior is well reported (Shreedhar & Mourato, 2019). Flagship species perform a crucial ecological role in promoting conservation (Walpole & Leader-Williams, 2001). Given the nature of the COVID-19 pandemic, there has been a restriction on leisure travel globally and a decrease of tourists to conservation sites, which not only has an impact on the reduction of tourist spending in a region but the potential for poaching and industrial activities to increase and encroach on conservation sites (Buckley, 2020). Previously socio-economic benefits were gained through the visitation of tourists and ultimately enhanced the development of the local community through tourist spending (Walpole & Leader-Williams, 2001). Today, it is crucial to consider more innovative methods of encouraging donation and the key drivers that likely influence someone's willingness to donate.

International conservation bodies have previously used flagship species such as pandas and tigers to raise awareness (Leader-Williams & Dublin, 2000). Many organizations

rely on charismatic flagship species in their fundraising efforts, which are commonly large and popular vertebrates associated with a particular habitat. Donations obtained through the use of flagship species in fundraising campaigns benefit other species within the same habitat and the broader conservation goals of the region (Caro & Riggio, 2013; Roberge & Angelstam, 2004; Sergio et al., 2008; Shreedhar & Mourato, 2019). While the fundraising debate explores the use of charismatic, or flagship, species to assist in obtaining funds for both the animal in question (Cornwall, 2018) and broader conservation (Gamborg et al., 2012), there has been little discussion in the academic literature around the use of flagship species, and what this means for a donor in relation to their intention to donate. However, it is unclear whether there is a difference between donors' attitudes toward helping a particular species or their willingness to donate extends to other conservational benefits.

Given a significant decrease in donations worldwide (Kim & Han, 2020) and fewer tourists visiting areas of conservation (Buckley, 2020), it is important to raise public interest and conservation activity for these threatened species. To support in-situ conservation programs, organizations associated with wildlife have developed different strategies to raise money directly (Lewandowski & Oberhauser, 2017) and indirectly, through donations to conservation entities (Colléony et al., 2017). One of the potential factors that might affect donors' interest and motivation to protect wildlife species is direct engagement with animals (Massingham et al., 2019). However, the majority of the population worldwide has little to no opportunity to directly see or experience the threatened species living in their natural habitat. Thus, conservation organizations have moved toward using VR to enable a realistic rendering of the endangered animal in its natural habitat (Conservation International, n.d).

Furthermore, the importance of using technology to connect people has increased drastically during the COVID-19 pandemic. According to Statista (2020), individuals who



spent time using VR in the US in 2020 increased during COVID-19 (Clement, 2021). This VR technology provides nonprofits with an opportunity to deliver content via VR.

## **2. Illustration of other contexts**

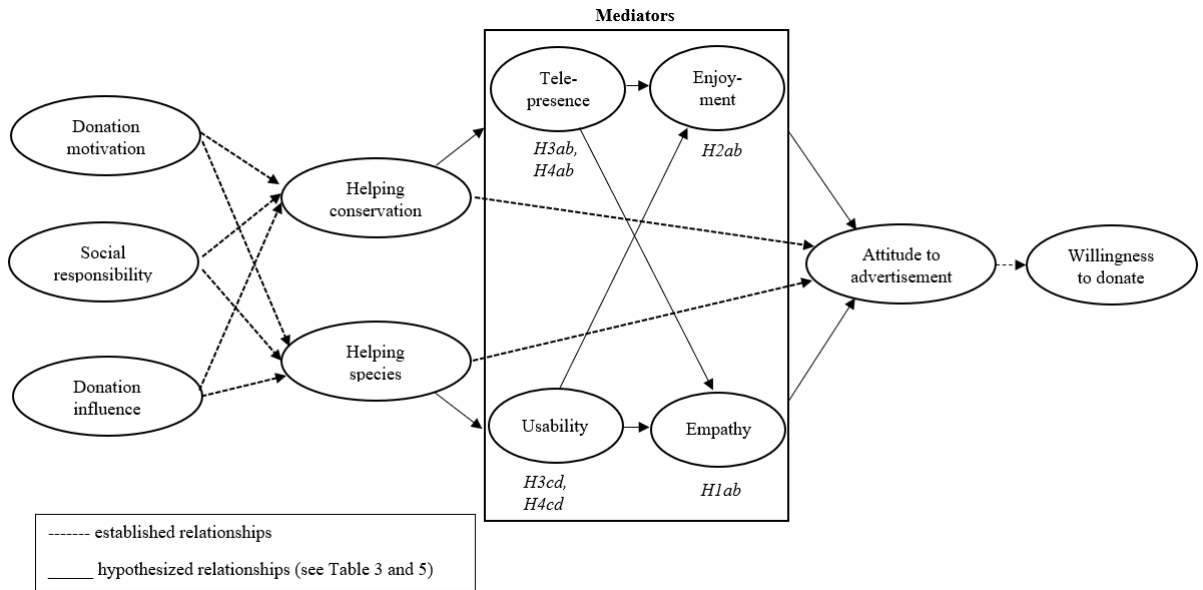
The academic literature has begun to consider the use of VR in charitable giving contexts (see Güreker & Kasulke, 2018; Kandaurova & Lee, 2019; Nelson et al., 2019; Yoo & Drumwright, 2018). The purpose of this paper is to examine findings from previous studies in charitable giving and VR and apply these in a human-animal donation context. Given the use of TpB as a prevalent model in the charitable giving literature, the theory underpins two studies illustrating charitable giving using VR in a non-human context. It is useful to understand the role VR plays in donations to flagship species. In addition, it is necessary to know if the attitude to donate is limited to a flagship species alone or if this attitude extends to broader conservation goals.

The efficacy of TpB as a model for charitable giving is evident within the academic literature (see Ajzen & Fishbein, 1975; Webb et al., 2000). The use of TpB for wildlife-related behaviors (Miller, 2017) has included management strategies, such as hunting (Shrestha et al., 2012), measures to control food storage from bears (Martin & McCurdy, 2009), the viewing of wildlife (Daigle et al., 2002), and the picking up of litter (Brown et al., 2010). Further, TpB has successfully predicted tourist intentions, increasing donations to conservation funds (Ham, 2013; Powell & Ham, 2008). Given the nature of the studies under investigation, the use of TpB allows for the addition of variables, which may better predict the situation (Ajzen, 1991; Miller, 2017). Thus, previous research has proven the utility of TpB given its flexible use and face validity (Miller, 2017) and its use to evaluate one's attitudes toward a behavior (Ajzen, 1991). As such, this study illustrates previous research using the TpB model and examines a non-human donation context. The factors included are drawn from discussions and testing within the prevalent and existing charitable giving

literature (see Figure 1): donation motivation (Crompton, 1979; Heckhausen et al., 2010; Hsu et al., 2010; Katz, 1960), donation influence (Curtis et al., 2014; Fisher & Ackerman, 1998; Mittelman & Rojas-Méndez, 2018; Smith & McSweeney, 2007; Yoo & Drumwright, 2018); social responsibility (Burgoyne et al., 2005; Hu et al., 2017; Manstead, 2000; Mittelman & Rojas-Méndez, 2018; Moriuchi & Chung, 2018; Pérez y Pérez & Egea, 2019), and willingness to donate (Ajzen, 1991; Hu et al., 2017; Masser et al., 2008; Miller, 2017; Veldhuizen et al., 2011).

In the context of charitable giving, attitude has been conceptualized as attitude toward helping others (Burnkrant & Page, 1982; Pessemier et al., 1977; Webb et al., 2000), and attitude toward the organization (Harvey, 1990; Schlegelmilch, 1988; Webb et al., 2000), which play a role in the overall willingness of one to donate. There has been much debate about the choice of saving a specific species (Cornwall, 2018) versus assisting conservation as a whole (Gamborg et al., 2012). More often than not, organizations tend to use one flagship species to encourage donations (Leader-Williams & Dublin, 2000) to both the species and broader ecosystem and tend to be selected based on characteristics believed to resonate with potential donors (Lundberg et al., 2020). Thus, two dimensions are proposed: 1. attitude towards helping endangered species; and 2. attitude towards helping conservation. These play an integral role in the proposed model (see Figure 1); however, additional constructs are considered for examination in the two studies presented in this paper. The novelty of VR is tested with the psychological elements and the technological elements of VR. These constructs elucidate the user's superior experience in virtual reality compared to traditional media.

Figure 1. Proposed conceptual model



### Overview of Studies

Two studies were conducted. Study 1 investigates the mediating role of psychological elements: empathy and enjoyment and tests H1ab and H2ab. Study 2 examines the mediating role of technological elements of VR: usability and telepresence. H3a-d and H4a-d are tested in Study 2.

#### 2.1 Study 1: Virtual Reality versus traditional media for donations

Prior studies found that VR is more effective when compared to traditional marketing methods (Van Kerrebroeck et al., 2017b). As such, this first study seeks to confirm the effectiveness of VR in a charitable giving context for non-human donations. The focus of this study is the use of empathy and enjoyment across media types. The psychological basis of VR’s persuasion effect can be attributed to its outstanding imagery reproduction capacity. VR-enabled fundraising communications can lead to a higher persuasion effect (Yoo & Drumwright, 2017).

Empathy relates to the ability to view the world from another’s perspective (Schutte & Stilinovic, 2017) and is linked both to altruism (John & Srivastava, 1999) and prosocial behavior (Jolliffe & Farrington, 2006). Empathy impacts intention to donate, as people are

more likely to donate to those they empathize with (Lay et al., 2020), while VR has been shown to enhance empathy (Schutte & Stilinovic, 2017).

*H1: Empathy mediates the relationship between a) helping conservation and attitude towards the virtual reality experience (static advertisement), and b) helping endangered animals and attitude towards the virtual reality experience (static advertisement).*

Media richness is not limited to users' cognitive responses, such as focused attention. Novak et al. (2000) argued that media richness could induce positive emotional responses such as enjoyment, which indicates telepresence in the content. Drawing from Csikszentmihalyi's (1997) flow concept, enjoyment stems from flow, accompanied by positive emotions or a sense of pleasure. Enjoyment is an element of having an optimal experience. Studies have found that high levels of enjoyment in computer-mediated interactions were correlated with higher exploration (Ghani & Deshpande, 1994).

Experiencing enjoyment of the virtual environment facilitates effective interaction in the virtual world, directly impacting users' behavior, including pleasure (Faiola et al., 2013). In a VR environment, users perceive the information to be fresh and novel because it is sensually vivid, enabling them to have a deep experience (Ramirez & Burgoon, 2004). Scholars found that technology-usage behaviors are affected by both extrinsic and intrinsic motivation (Park & Nicolau, 2015). Enjoyment is an individuals' intrinsic motivation (Li & Chen, 2019). Customers' perceived enjoyment of technology plays a mediating role in the relationship between the usage of the technology and their behavior intention (Li & Chen, 2019; Rauschnabel, 2018). VR media generates superior media effects, including enjoyment, thus leading to higher donation intentions than a static advertisement (Yoo & Drumwright, 2017).

*H2: Enjoyment mediates the relationship between a) helping conservation and attitude towards the virtual reality experience (static advertisement), and b) helping endangered species and attitude towards the virtual reality experience (static advertisement).*

### ***Method***

In this study, 107 participants assessed two different modalities: VR (55 respondents) and static advertisement (52 respondents). The majority of the respondents were between 18 and 24 (89.7%), followed by 25 and 31 (10.3%). These respondents identify themselves as undergraduate or graduate students. Males represent 50.5% of the respondents.

Before the experiment, the VR group respondents, recruited from a major university in the US, were asked to complete a survey seeking their donation experiences. Next, each individual put on an Oculus Rift headset and was provided a designated open space in the VR lab. Respondents were briefed on how to navigate within the VR environment. None of the respondents in the VR group had experience using a VR headset. The VR content was based on existing VR content created by National Geographic. Respondents were tested for their preference toward National Geographic, which had no confounding effect on their attitude. The static images are clips from the video, thus consistent with what was shown in the VR videos.

Respondents answered a list of questions on their experience with donations. Next, they were introduced to the VR and instructed what to do once their VR headsets were put on. They were told that they could freely roam around within their given space, not too far nor close, so the sensor could detect the headset and not lose connection. The respondents were told they would be watching a conservation video but not told there was an animal. When the VR experience ended, respondents proceeded to answer a set of questions regarding their enjoyment, empathy, attitude toward the VR advertisement, and their willingness to donate based on their VR experience. The procedure and questions were the same for the static advertisement group and collected again via Clickworker. All respondents were based in the US. The only difference is the modality of delivery: instead of the VR headset, they were exposed to a static advertisement on the endangered species. Pandas were

chosen given both their endangered and charismatic flagship status (Leader-Williams & Dublin, 2000).

### **Results**

An independent samples t-test compared willingness to donate in the static advertisement and VR conditions. There was a significant difference in the scores for the static condition ( $M=4.50$ ,  $SD=1.60$ ) and the VR condition ( $M=5.16$ ,  $SD=1.39$ );  $t(105)=2.29$ ,  $p < .05$ . The result suggests that the modality of how the advertisement is delivered does impact donors' willingness to donate to an endangered species.

Participants have experienced donating to an organization or others as follows: 1-2 times (36.4%), 3-4 times (16.4%), 5-6 times (5.5%), and individuals who donated more than 6 times accounted for 7.3% of the sample, while 34.5% have not donated before. An exploratory factor analysis evaluated social responsibility, social influence, donation motivation, attitude toward endangered species, conservation, and willingness to donate. Empathy (4 items; Jolliffe & Farrington, 2006) and enjoyment (4 items; Moore et al., 2009) constructs were measured. All factors had a loading of ( $>.4$ ), and the final analysis considered all items.

Convergent validity of the measurements was conducted, with all AVE values well above the minimum threshold of 0.5 (Bagozzi & Yi, 2012). All standardized loadings were above 0.5 ( $p < .001$ ), demonstrating indicator reliability and composite reliability. All of the constructs exhibit discriminant validity. Discriminant validity is also measured using the Heterotrait-Monotrait Ratio (HTMT) quality criteria. The maximum HTMT value was 0.9, at the threshold of 0.9 (Henseler et al., 2015).

A complete bootstrapping procedure was also conducted to check the HTMT inference and all values were below the threshold of 1.0 (Henseler et al., 2015). The variance inflation factor (VIF) was calculated to assess multicollinearity and was below the threshold of 5 (Hair et al., 2010), and the tolerance level was above 0.2. These results show strong

evidence for the reliability and validity of construct measures. According to Hair et al. (2014), PLS-SEM does not assume that the data are normally distributed. Thus, instead of using the Kolmogorov-Smirnow and Shapiro-Wilki test, PLS-SEM uses a bootstrapping procedure to test the significance of the path coefficient.

The essential criterion in PLS path models for assessing the structural models is the coefficient of determinations ( $R^2$ ) of the endogenous latent variables (Henseler et al., 2009). The percentages of the explained variance ( $R^2$ ) value for attitude toward advertisement, attitude toward helping endangered species, attitude toward helping conservation, empathy, enjoyment, and willingness to donate are as follows for VR: 0.30, 0.57, 0.45, 0.36, 0.36, 0.31 respectively; and static: 0.36, 0.71, 0.42, 0.30, 0.29, 0.53, respectively. We ran a bootstrap analysis by following the procedure suggested by Hair et al. (2012). The nonparametric bootstrap analysis of 5000 subsamples and 300 cases revealed the proposed relationships. Table 2 displays the result of the path analysis of the model, and Table 3 presents the mediating results for the two groups, identifying differences in relationships between static and VR advertisements. All hypotheses were supported except H2ab (static advertisement).

-----Insert Table 2 Here-----

The PLS-MGA with percentile Bootstrap approach was applied to find out whether there are numeric differences between valence-specific path coefficients. The path coefficients are equal across the two groups. Specifically, the analysis yields the following relationships: attitude toward helping endangered species→attitude towards advertisement ( $p<.05$ ); attitude toward helping conservation→willingness to donate ( $p<.95$ ); social responsibility→attitude toward helping endangered species ( $p<.01$ ), rendering a significant difference at  $p<0.05$  or larger than  $p>.95$  (Sarstedt et al., 2011). This result suggests that at least one path coefficient differs across the two groups in respect to the predicted relationships.

All except H2ab for the static advertisement were supported for the mediating results. This result suggests that donors do not perceive any enjoyment from a static advertisement; however, they enjoy watching the VR donation-related content. Thus, our findings emphasize the need to encourage interaction with a species to enhance willingness to donate.

-----Insert Table 3 Here-----

### *Covariate Analysis of Donors' Prior Donation Experience*

Donors' prior experience was measured as a covariate to determine whether it impacts wildlife conservation donation. The result shows that prior donation experience only affects attitude toward donating to conservation with enjoyment as the mediator for the VR condition  $F(3, 50)=3.74, p<.05$ . Prior donation experience did not impact other hypothesized mediation relationships in either of the conditions (VR versus static advertisement).

### *Discussion*

The application of a conceptual model using TpB, prominent in charitable giving, to assess two different modalities for the donation context highlights the difference in the emotional evaluation of donors' experience between two VR and static advertisements. Based on the results, when the intent is to help endangered animals, VR technology is more effective in driving a positive attitude toward helping the wildlife. Table 3 shows that donors' empathy and enjoyment derived from VR technology have a stronger impact on leading donors to have a positive attitude toward the advertisement. On the contrary, the result shows that if the intent was to help wildlife conservation, then the design of the static advertisement needs to have information or stimuli that bring out empathy in donors. Overall, the results show that empathy is necessary even in the human-animal relationship. Furthermore, enjoyment of the advertisement contributes toward the positivity toward the advertisements.

## **2.2. Study 2: Virtual Reality Elements**



Given the confirmation of the effectiveness of VR for human-animal donations, a second study evaluates VR elements. Immersive visual experience has been a feature of VR technology and can provide physical immersion and psychological presence (Gutierrez et al., 2008). Telepresence is a step beyond immersion and defined as the subjective experience of being in one place or environment (e.g., virtual environment) while simultaneously being in a physical location (Witmer & Singer, 1998). When an individual experiences telepresence, it is an indication that the user feels immersed and present in a virtual environment. Studies have indicated that interactivity enhances users' cognitive and affective evaluations in utilizing a new technology (Yim et al., 2017). Telepresence is a mediated experience of spatial presence often used in a virtual environment (Biocca et al., 2003). The mediating role of telepresence also has been highlighted as a factor in generating positive consumer evaluations. Slater et al. (1996) and others (Antonietti & Cantoia, 2000) found that VR users often experience a sense of deep focus free from distraction within the VR environment. Telepresence arises from a commitment to attentional resources to remote tasks, increases enjoyment, and facilitates greater degrees of motivation in a virtual environment (Faiola et al., 2013).

According to Slater (2009), a high level of presence in a simulated environment is assumed to have similarities with the user's actual behavior. Waterlander et al. (2015) posited that a high telepresence score showed a stronger similarity between a user's virtual behavior and their actual behavior in shopping. Furthermore, Güreker and Kasulke (2018) found that participants who used the 360° VR headset donated a higher amount when compared to those who received only a written donation request with no video. Thus, the stronger feeling of telepresence through the VR, the more realistic a user's behavior is.

*H3ab: Telepresence and empathy mediate serially between a) attitude toward helping conservation, and b) attitude toward helping wildlife and attitude toward advertisements.*

*H4ab: Telepresence and enjoyment mediate serially between a) attitude toward helping conservation, and b) attitude toward helping wildlife and attitude toward advertisements.*

Schnack et al. (2019) argued that when a simulation creates a more immersive experience (e.g., shopping) which translates to stronger perceived telepresence, it needs to offer an equivalent degree of usability. While Schnack et al.'s (2019) study examines an online grocery shopping environment, it recommends usability of the controls for VR technology. They found that high usability leads to more naturalistic user behavior in a virtual environment when there is high usability. This naturalistic behavior could significantly decrease systematic biases in virtual environment behavior and lead to more accurate depictions of the actual behavior in a physical environment.

Aitamurto et al. (2018) add that usability of the VR technology could provide a method for effective perspective-taking, which leads to empathy, and attitude change. They add that usability issues such as difficulty following the narratives of a video challenged users' experience, which leads to compromising the sense of presence, and subsequently affecting any user's understanding of others' perspective (e.g., empathy). Based on the flow theory, Csikszentmihalyi (1997) argues that a heightened enjoyment occurs more readily when there is a balance between a user's skill set and the difficulty of the task. Since being in the flow has characteristics of concentration on a task, distracting stimuli would separate a user from the task (Draper & Blair, 1996). Furthermore, studies have shown that ease of use encourages users to continue using immersive technology, which leads to enjoyment (Adamo-Villani et al., 2008).

*H3cd: Usability and empathy serve as serial mediators between c) attitude toward helping conservation, and d) attitude toward helping wildlife and attitude toward advertisements.*

*H4cd: Usability and enjoyment mediate serially between c) attitude toward helping conservation, and d) attitude toward helping wildlife and attitude toward advertisements.*

## ***Method***

This study tested VR features on the same promotional advertisement for wildlife conservation across two groups: VR (81 respondents) and static (80 respondents). H3a-d and H4a-d are tested in this study. The procedure and questions were the same for both groups, and data were collected via Prolific. All respondents were based in the US. The majority of the respondents were between the ages 18 and 24 (22.2%), 25 and 31 (25.9%), 32 and 38 (29.6%), 39 and 45 (16%), and the rest were above 46 years old (6.2%). Males represent 81.5% of the respondents. An independent samples t-test found no differences across gender toward their attitude toward the advertisement, telepresence, usability, enjoyment, or willingness to donate.

Before the experiment, the VR group respondents completed a survey exploring their donation experiences. All of the respondents in the VR group had experience using the headset and screened for Oculus Rift ownership before their inclusion in the study. Despite the limitations of collecting data online given social distancing requirements, the time spent on the experiment was similar to those in the lab (approximately 13 minutes). Next, each individual in the VR group was given instructions on when to put the Oculus Rift headset on. Upon completing the VR experience, respondents then completed the rest of the survey seeking their enjoyment, empathy, features of the VR, attitude toward the VR advertisement, and willingness to donate based on their VR experience. For the static advertisement group, the procedure is the same, excluding the use of a VR headset. They were exposed to static wildlife conservation advertisements about the endangered species, again pandas.

## ***Results***

An independent samples t-test compared attitude toward the advertisement in both static and VR conditions. There was a significant difference in the scores for the static condition ( $M=3.34$ ,  $SD=1.57$ ) and the VR condition ( $M=6.58$ ,  $SD=1.49$ );  $t(159)=11.41$ ,  $p < .001$ . The result suggests that the modality of how the advertisement is delivered does impact donors' attitude toward the advertisement they see.

In this second study, the majority of the participants were familiar with wildlife conservation: slightly familiar (51.9%), moderately familiar (25.9%), and extremely familiar (9.9%). They have experienced donating to an organization or others as follows: 1-2 times (27.2%), 3-4 times (24.7%), 5-6 times (7.4%), and individuals who donated more than 6 times accounted for 32.1% of the sample, while 8.6% have not donated before. The same constructs were used to validate Study 2. Telepresence, which included control factors, sensory factors, and telepresence factors (7 items; Witmer & Singer, 1998), as well as usability (3 items; Waterlander et al., 2015), were also measured for Study 3. All factors had a loading of ( $>.40$ ), and the final analysis considered all items.

Similar to the first study, the coefficient of determinations ( $R^2$ ) of the endogenous latent variables (Henseler et al., 2009) were measured. The percentages of the explained variance ( $R^2$ ) value for attitude toward advertisement, attitude toward helping endangered species, attitude toward helping conservation, telepresence, usability, enjoyment, and willingness to donate are as follows for VR: 0.23, 0.78, 0.47, 0.25, 0.36, 0.26, 0.64 respectively; and static: 0.07, 0.68, 0.59, 0.33, 0.28, 0.21, 0.73 respectively. We ran a bootstrap analysis by following the procedure suggested by Hair et al. (2012). The nonparametric bootstrap analysis of 5000 subsamples and 161 cases revealed the proposed relationships. Table 4 displays the results of the path analysis, and Table 5 presents the mediation results, which test the hypotheses for the two groups. All hypotheses except H3ab were supported.

-----Insert Table 4 Here-----

Similar to Study 1, the determinacy of the numeric differences between valence-specific path coefficients are statistically significant; the PLS-MGA with percentile Bootstrap approach was applied. The path coefficients are equal across the two groups. Specifically, the analysis yields the following relationships: attitude toward helping endangered species→usability ( $p<.05$ ); attitude toward advertisement→willingness to donate ( $p<.001$ ); donation motivation→attitude toward helping endangered species ( $p<.05$ ); social responsibility→attitude toward helping conservation ( $p<.05$ ); usability → willingness to donate ( $p<.05$ ); attitude toward helping conservation → willingness to donate ( $p>.95$ ). These paths rendered a significant difference at  $p<0.05$  or larger than  $p>.95$  (Sarstedt et al., 2011). This result suggests that at least one path coefficient differs across the two groups in respect to the predicted relationships. All hypotheses in the mediation results are supported (see Table 5).

-----Insert Table 5 Here-----

### ***Discussion***

Based on these studies, VR is an effective way to raise awareness of the conditions of the endangered species and encourage behavioral action, especially when it has a clear target audience. New technology such as VR is highly effective in attracting interest (Nelson et al., 2019), which is an important factor in encouraging organizations to invest in new technologies. An independent samples t-test indicated that the modality (VR versus static) was not affecting donor attitude. Instead, based on the results in this study, donor attitude is affected by the elements of the technology. Certain technology elements can attract consumers' attention and keep them engaged (e.g., VR). While not directly related, prior studies (Hatzithomas & Zotou, 2016) found that a 3D advertisement catches greater attention when compared to a 2D advertisement while controlling for the time spent on the

advertisement. Their study suggests that the multidimensional element of 3D can affect consumers' attention to an advertisement. Following that study, it is reasonable to argue that VR is not only multidimensional. Its technological elements allow users to experience telepresence and engage with the content.

Based on the first set of serial mediators (telepresence, usability, and empathy), static advertisements do not trigger any empathy when paired with telepresence. However, empathy served as a mediator when the serial mediators were introduced (empathy and usability) for the static advertisement. Thus, all hypotheses except H3ab for the static advertisement are supported. The result suggests that donors need to feel the telepresence when interacting with the advertisement to have empathy toward endangered animals or the conservation. It also highlights that VR has a superior effect on positively encouraging people to have a positive attitude toward an advertisement due to its telepresence capability. In addition, this result suggests that when donors find a virtual advertisement easy to navigate (e.g., usage and understanding of content), there is a higher likelihood that they will develop empathy toward the advertised subject. The result also implies that when donors can retrieve the information, they need to persuade them to donate, and the technology or tool used needs to be user-friendly.

In the second series of mediation analyses (telepresence, usability, and enjoyment), the result shows that donors do not experience any enjoyment with static advertisements. Despite the high resolution of the graphics and the ease of reading the content, those features do not drive donors' enjoyment toward the static advertisement. On the other hand, for the group that was exposed to the VR advertisements, with donors experiencing telepresence and easy navigation within the VR advertisement, the direct relationship toward their attitude toward helping conservation and donating was diminished. Thus, all hypotheses except H3ab (static advertisements) and H4abcd (static advertisements) are supported. Results show that

H3ab and H4abdc did not support the serial mediation but did have single mediation through telepresence or usability.

These results validate Study 1 result where it shows that enjoyment did not mediate the hypothesized relationship for static advertisements. Furthermore, this suggests that donors need to experience the virtual environment and easy navigation if the call was from wildlife conservation. On the other hand, when the call for donation is directly related to the endangered animals rather than conservation-based, the attitude toward the advertisement is enhanced with the mediators (telepresence and usability). This result suggests that static advertisements need to be visually appealing - to a point where it enables donors to visualize the animals in their natural habitat to encourage a positive impact toward the attitude. The results show that, unlike the VR advertisement, the static advertisements did not provide any enjoyment. Furthermore, the mediation results suggest that static images do not have the same level of usability functions (e.g., technological and interactive), highlighting that VR's usability is vital in donors' likelihood of enjoying the content shown.

Between the empathy and enjoyment mediators, the result suggests that a donor's attitude toward an advertisement can be persuaded more by empathy than it can with the enjoyment of a static advertisement. On the contrary, all the mediators (empathy, enjoyment, telepresence, and usability) need to be present to strongly impact attitude toward donating.

### **3. Future Research Agenda**

Our studies confirm the potential use of VR in a non-human donation setting. However, there is still much work to be undertaken, and as such, we propose future research areas to extend the use of VR in non-human donation contexts. Our studies summarize the benefit of VR when compared to static advertisements, given the evidence of immersion and enjoyment contributing to its use (see Table 6).

-----Insert Table 6 Here-----

Based on existing VR literature, VR in the donation context is still in infancy. There remains room for progression in both breadth and depth in the literature regarding the methodological and theoretical application. VR in donation has been touted to provide disruption and paradigm shifts to charity work and new insights into the ecosystems for consumers. We propose a three-way agenda for future research on VR donation, structured along thematic, methodological, and technological lines.

### **3.1 Thematic Agenda**

#### *The adoption of VR technology in other areas related to donations*

Donors' general attitude, acceptance, and adoption of VR donation should be further explored across different contexts. Our studies have confirmed its use in a non-human donation context, but there is still much to be explored. Most of the studies were conducted in a lab environment with limited samples. The study of frequent donors regarding their own attitudes and intention to use VR technology in a donation context can provide more practical value for satisfying current market demand and improving future VR donation experiences. Cultural factors could also affect donors' willingness to accept new technologies. Cheng, Yang, and Andersen (2017) studied the impact of VR on Japanese culture. They found that their VR game design increased participants' sense of involvement in the Japanese culture. It provided an opportunity to leverage culturally relevant physical interaction. Kandaurova and Lee (2019) studied the effect of VR and the role of social exclusion. They asserted that social exclusion is a complex and multidimensional phenomenon that depends on many factors, including personality, situations, and cultural differences. These cultural differences refer to the independence or interdependence of individuals. They found that VR can enhance the level of guilt and social responsibility for people who feel socially excluded, leading to higher intention to volunteer. Thus, future VR studies could cover donors from different cultural backgrounds. For example, a cross-cultural study of VR donation targeting global



consumers is an opportunity. Cultural values may influence consumers' psychological reactions and behavioral responses to VR donation.

### *The effectiveness of VR Donation and Humanitarian*

VR technology can change the effectiveness of donation because technical changes alter the nature of input and output of consumption (Whyte & Nikolić, 2018). Donation effectiveness can be realized when the donor can obtain information to aid their donation process. Thus, when the information gathering process and the donation process are optimized, consumers' perceived value toward their donation experience would change. Furthermore, even social aspects (single donor versus a group of donors) may potentially influence the effectiveness in the VR donation context, which has not been addressed in the existing literature. In addition, the time spent traveling to actual wildlife conservation sites and other temporal and psychological resources could change the usability evaluation of the VR system.

Filmmakers and producers claim that VR films are immersive and can amplify empathy for victims of humanitarian crises and move the viewer to support humanitarian aid organizations (Milk, 2015). Gruenewald and Witteborn (2020) found that VR films can stimulate engagement with global problems when they cater to the emotional needs of people engaging with those problems.

Social marketing aims to influence behaviors and would benefit individuals and the communities. However, to do so, all marketing mix elements need to be considered. Among these elements, promotion is assumed to be the most important and associated with the common understanding of a social campaign. Advertisement in the media is one of the strategies in delivering a successful social campaign (Borawska et al., 2020). Aside from traditional communication channels such as TV and social media, the use of VR games as a form of promotion has been widely popular and provides users' engagement and immersion,

increasing the effectiveness of social advertising. Thus, the effectiveness of VR could be enhanced through gamification theory, leading to the following potential research questions:

- To what extent does the integration of gamification theory educate potential donors about the importance of wildlife conservation?
- To what extent does the integration of gamification theory enhance the promotion of fundraising efforts to potential donors?
- To what extent does the gamification of VR donations engage and immerse individuals?

#### *Physical Space versus VR*

Wildlife provides a basis for valuing and protecting species. Thus the conservation of species, based on an instrumental value, is problematic for conservation workers because they put the onus of proof on the side of the conservator. Further, VR allows potential donors to ‘experience’ the flagship species in another way, connecting the physical space to the digitalized world. Given the impact of the pandemic on travel and the need to increase funding and spending across developing communities and conservation efforts, there is the potential for VR to substitute for travel in uncertain times. As such, this leads to the question:

- To what extent can VR replicate the in-person experience?

#### *Human versus animal donations*

However, Caviola et al. (2019) asserted that prosociality towards animals, in the context of charitable donations, is different from that of humans. They argue that people have a speciesist attitude based solely on their species membership. They found that empathetic concern was a stronger predictor for helping humans than animals. Future research could explore differences using VR between human-human and human-animal donations to evaluate better the potential speciesist attitude outlined by Caviola et al. (2019). As such, we propose the following question:

- To what extent do empathy and enjoyment differ for human-human versus human-animal donation when using VR?

*“Shared Resources” for VR donations among Endangered Animals*

The instrumental value in saving one type of endangered species over another would be grounds for debate. There is an ongoing challenge for endangered species conservation. Since it is rare and endangered, the argument has been against the type of value these species may provide. Thus, the decision to save one over the other due to resource constraints poses an ethical challenge. This view of humanity and ethical behavior is fundamentally pessimistic. In general, while there is a strong reliance on our species to protect endangered species, it is not possible for humans “make use of the very character traits that endangered them in the first place” (Paterson, 2006, p. 146). Another consideration is the use of flagship species to divert funds to broader issues, including other species, the ecosystem the animal inhabits, or the community residing nearby (Walpole & Leader-Williams, 2001). These external forces can sometimes benefit from tourism when people travel to visit such flagship species and contribute more widely to community and conservation goals. However, there is little research exploring the use of this messaging or discussion around where the money goes for consideration by potential donors when using flagship species to promote fundraising activities. From this, the use of a flagship species to fund wider conservation efforts has the potential to lead to ethical dilemmas. For example, interaction with the animal through a VR setting could yield a higher likelihood of donations. However, such funds raised could benefit the wider community and conservation efforts. Furthermore, it is uncertain whether wider goals be incorporated into the VR element or part of the wider messaging. Thus, a number of research questions can be derived from this:

- To what extent can added engagement with flagship species raise funds for other elements?

- To what extent should the VR experience focus solely on the flagship species?
- To what extent does the messaging used have the potential to cause ethical dilemmas (e.g., knowledge of where the funds go)?

### 3.2 Methodological Agenda

#### *Comparative study design in a donation related context*

In future research, a comparison between VR and other donation contexts could be carried out through different research methods such as case studies and longitudinal studies. Given there are mixed results on the difference between VR and donation between human and non-human context and the potential for future research (e.g., the VR wildlife is the same as the real wildlife; the VR environment creates a better experience than the real wildlife environment), the role and value of VR in the donation context needs further consideration. Thus, there is a lack of rigorously comparative study between the VR wildlife conservation and another donation context (e.g., conservation site with immersive technologies such as mixed reality, actual wildlife conservation site). In addition, when the technology is perceived to be a visual output technology, VR can also be compared to various content displays (e.g., 3D interfaces) to influence different aspects of the wildlife experience that leads to donation in future studies.

- To what extent can VR add value (e.g., hedonic versus utilitarian value) toward charitable context.
- To what extent is VR comparable to other 3D displays (e.g., holograms)?

#### *Comparative study design in other types of context*

VR has become a cultural handle that attaches to diverse ideas and technologies. In the cultural heritage field, the preservation of historical sights and the finished reconstructions of empty monuments are important in contributing and representing the true history of a particular culture (Pujol-Tost, 2011). The use of VR as a space simulator has

shown effectiveness and potential in gaining various spatial and information knowledge and analyzing people's cognitive and behavioral skills (Debailleux et al., 2018). Furthermore, in landscaping (Griffon et al., 2011), the challenge that land managers and policy-makers face is the difficulty in communicating the visual impact of a management option to stakeholders, especially when the landscape exhibits a high cultural value. Thus, through the use of virtual reality, different types of land use (e.g., in culturally sensitive surroundings) can be visualized to inform stakeholders and to account for the perception of the landscape by the general public, and to predict the evolution of landscape based on management decisions (Bell, 2001).

VR has also been proposed in psychotherapy (Riva, 2005) as a part of the future of clinical psychology and other mental health care streams. While there is an opportunity to use VR as an intervention tool, it also has its challenges (Riva, 2005).

- To what extent does VR contribute toward advancement in industry practices (e.g., clinical, land usage effectiveness)
- To what extent does VR contribute toward efficiency in work/sales productivity

#### *Content Richness Donation Context and VR environment*

Future research should investigate donors' experience of interacting with different types of animals in various contexts (e.g., zoo, wildlife, classroom). The majority of the existing research has used flagship species (Xiang et al., 2011) such as polar bears (Markowitz et al., 2013), tigers, dolphins, turtles (Thompson & Rog, 2019) for conservation appeals, which has limited the research results to a small portion of wildlife species. Flagship types have been understudied in a VR donation context. Thus, future studies could design different VR videos to include species that include flagship fleets, discussing these flagship species' impact on ecosystems and biodiversity, giving a diversity of wildlife species further consideration.

While our studies explore the use of a flagship species quite often selected for being a

charismatic mammal, pandas, given their wide use in conservation-style fundraising efforts, there is the potential to consider other less charismatic species. The potential use of VR and the added feelings of engagement with potential donors could lead to the potential to expand beyond traditional ‘flagship species’ and enhance the scope for further fundraising efforts.

Thus, a key research question to explore is:

- To what extent is VR effective for a range of species in terms of donations?

#### *Experiment control in VR Donation-Related Context*

The experimental design conducted in Study 1 and 2 could be improved further to increase the validity of the results. Future research should include a control group and perhaps improve the measurement techniques to increase the validity of VR usage in donation related research based on experimental methods. Another opportunity is to experiment in the natural setting (e.g., in the field) rather than in a laboratory (Van Kerrebroeck et al., 2017b), which could increase external validity for future research purposes. Thus, this emphasizes the need for the previously outlined research question to consider the value of the in-person experience and the potential replication in a VR context.

### **3.3 Technological**

#### *Increase interactivity in VR Context*

Future research should transition consumers to become donors by increasing their interactions with objects in the VR setting to create more natural and realistically simulated wildlife experiences. One of the important features of virtual reality is interactivity. Although we have tested engagement in our study, it was limited to simple interaction with virtual animals such as pointing and clicking, undermining the prominent advantages of VR compared to other donation contexts. Thus, future research should consider creating more natural and necessary interactions with animals and the environment in the simulated

environment, such as feeding the animal, touching and picking, and using more advanced and multi-functional interactive devices. Thus, we propose future research should consider:

- To what extent do different levels of VR interaction influence the likelihood to donate?

### *Multisensory technologies*

Being in the VR environment not only enhances your presence, transporting you to a state of telepresence. Ideas for future research in the technological aspect of VR could include haptic devices where users of the VR can sense the vibration of the object they touched. Olfactory technologies to transmit scents (e.g., the scent of the habitat) could also contribute to a more sensory experience. Since our perception in the real world is multisensory, it is natural to include those senses in a simulated VR environment to promote perceived realism. Thus, exploring the application of these multisensory interactive technologies in VR conservation context is full of possibilities, as they will be able to provide donors a wider sensation range and richer sensation experiences. These experiences will contribute to understanding how different sensational wildlife interaction experiences influence each other. In line with the proposed evaluation of increased VR interaction, we suggest that future research considers:

- To what extent do haptic devices influence the likelihood to donate?

### **3.4 Concluding statement**

Our studies make several important contributions by illustrating the use of VR in a non-human donation context. We outline thematic, methodological, and technological aspects in relation to a proposed future research agenda. There is a need to educate individuals and respective stakeholders on why it is worth protecting endangered species and broader conservation goals by attributing its value to humans. Our studies emphasize the important contribution the use of VR can make, by encouraging enjoyment and telepresence, thus

increasing the likelihood of potential donors to form stronger bonds or associations with these species and ultimately help to save them. There is still much work to be done within this field, and we seek to contribute to the wider conversation on the potential of VR in a non-human donation context.

#### *Data Availability Statement*

*The data that support the findings of this study are not publicly available due to privacy or ethical restrictions.*

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