Bachelor Thesis:

The Drones Are Coming:
Fostering Acceptance Within the Implementation of Unmanned Aerial Vehicle Surveillance

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Abstract

Due to the immense benefits drones are contributing to the public safety sector, a willingness on part of law enforcement and emergency services exists to incorporate UVA's into everyday sectors. However, public opinion on the pervasive use of drone technology in various societal domains is not purely positive. Opponents fear that their privacy rights might be violated and their safety at stake. This research paper aims at creating common ground between these opponents and proponents of governmental drone usage, by investigating different factors that might positively influence overall drone acceptance. Therefore, this study examined how drone acceptance can be fostered by tailoring information about a drone's presence to different environmental setting in which they are employed. Additionally, the impact of a person's level of uncertainty avoidance and need for control on drone acceptance was investigated. Using VR, participants were confronted with drone surveillance within a park, a business area or a festival. An app on their virtual phone provided them with either transparent information about drone employment or a neutral message with no content referring to the drone. Results indicated that an interaction between environmental conditions and transparency of information had an effect on drone acceptance. Further, uncertainty avoidance showed an effect on drone acceptance among different environmental conditions. Additionally, higher levels of trust towards the organization heightened the level of drone acceptance and lowered the level of perceived control. These results contribute to the importance to carefully consider environmental conditions and people's need for certainty and information when exposing people unexpectedly to drones.

Keywords: Drones, Acceptance, Transparency, Environment, Uncertainty avoidance

Introduction

For a long time, drones were mainly associated with complex and secret military use within specialized operations. However, in the last decade, the scope of drones has widened (Cauchard, Zhai, Spadafora, & Landay, 2016; Giones, & Brem, 2017). Drones are unmanned aircraft (UVAs) that can be navigated autonomously and beyond the line of sight (Sullivan, 2006). Their handiness made public domains aware of their usefulness within sectors such as transportation, agriculture, leisure, communication and safety. In the latter domain, especially law enforcement and fire departments all around the world, see UVAs becoming essential due to their bird's eye perspective. Where the human eye and ground technology fails, drones are able to keep track of complex and overextending situations.

Nowadays, the role drones play in disaster mitigation and environment preservation can be demonstrated by means the costliest world disaster of 2018, the 'California's Camp Fire'. The disaster mitigation illustrated drones' indispensable role and the importance of expanding drone usage in emergency services (Reagan, 2019). The series of wildfires claimed lives and destroyed buildings. However, the consequences would have been much worse had it not been for fast damage assessment and disaster response due to drones. The visual and thermal imaging cameras attached to drones provided real-time video footage to incident commanders, enabling them to get a better understanding of the situation and to advise the recovery crew as efficient as possible.

After similar effective disaster management cases, the Los Angeles Fire Department (LAPD) announced a partnership with DJI, the world's largest drone manufacturer in the word. This partnership wants to enable "address(ing) life-threatening situations faster and more effectively than ever before" (McNabb, 2019). Hence, a willingness to incorporate drones into the public safety sector exists on the side of the law enforcement and emergency services as well as drone manufacturing companies.

Furthermore, drones qualify for safety and security surveillance within traffic situations. Governments can employ drones as traffic enforcement devices which can effectively monitor and detect high-risk driving behaviour and, thus contribute to the mitigation of both (Foina, Sengupta, Lerchi, Liu, & Krainer, 2015; Rosenfeld, 2019). Another area where drones can increase efficiency and effectiveness is law enforcement. This line of work is dependent on fast and precise decision-making when it comes to criminal incidents such as gun assaults. In such cases, real-time intelligence and life-video footage provided by drones are extremely important, in order to assess the situation correctly and react appropriately (Murison, 2019). As highlighted

by the examples above, the use of drones is not constrained to a certain area but seems applicable to many diverse contexts and domains.

Despite the fact that there are various positive implications of drone usage, the degree to which the general public is willing to cooperate with drones is still a matter of debate. The public opinion on drones is still far from being purely positive. Several studies examined the effect that because of privacy concerns, people often might feel slightly uncomfortable when a drone is entering their direct environment (Vattapparamban, Guvenc, Yurekli, Akkaya & Uluagac, 2016; Khan, Tausif, & Malik, 2018). The presence of drones prompts civilians to be more suspicious and self-aware, while at worst feeling like their privacy is violated. As a consequence, civilians might react in an aggressive way and attack the drone (Clothier, Greer, Greer, & Mehta, 2015). Therefore, pervasive use of drones might bear the potential to bring about various societal concerns and challenges.

From the aforementioned research, it can be inferred that there is a division between opponents and proponents of drone usage. On the one side, opponents emphasize the risks and concerns related to security and safety. On the other side, the proponents see the aforementioned advantages of drone usage in terms of security and efficiency. This lack of consensus has stimulated researchers as Oltvoort, de Vries, van Rompay and Rosen (2019) to find common ground. They intended to find out whether drone perception, as well as drone acceptance, might be determined by different types of settings and information-disclosure strategies. In their research participants felt more uncomfortable when a drone emerged in a more private setting like a park, compared to a more public setting, such as a large event. In the more crowded settings, participants could infer that the presence of the drone could be ascribed to safety reasons. More interestingly, they showed that not only the level of need for information but also the information content that participants desired differed based on the environment they were situated in. Thus, regarding drone presence, it is not only important whether information is provided at all but also what kind of information is provided.

The question remains as to what kind of information-disclosure strategies make people accept drones in which environment. To illustrate, a drone might be more disruptive in a calm setting, as a park. This may prompt a higher need for detailed information explaining the presence of the drone as compared to, for instance, a festival. In other words, the way people experience the presence of drones in terms of security and safety may be connected to which information strategies are used in which environments. Experiencing a drone negatively might be diminished when different information-strategies are adjusted to different environments so

that ultimately the information that is required in the respective environment can be provided. Consequently, the current research aims at finding answers to the following research questions:

RQ1: *How does drone acceptance vary between different environments?*

RQ2: *Which information-disclosure strategies affect trust and perceived control and thereby contribute to drone acceptance?*

Theoretical Framework

Despite the increasingly positive implications of drones, people might often still feel uncomfortable in their presence due to concerns about necessity and privacy. Therefore, more empirical research is necessary to establish risk factors and mitigate them (Sandbook, 2015). Hence, this research paper is going to investigate several factors which are outlined in the following.

Privacy concerns. One of the most common concerns is privacy. People commonly fear that drones invade their privacy and capture their most intimate moments (Goshray, 2012). Custers (2016) examined how people feel about and react to surveillance technology and divided the way such technology affects us into several clusters. For instance, firstly, people who are aware of being monitored act more self-consciously and less free-wheeling. This is referred to as the ‘Chilling effect’. Secondly, the ‘Function creep effect’ describes the mistrust the public has toward the government abusing generally useful new technology for surveillance purposes. Lastly, the ‘Privacy of location and space effect’ refers to people’s right to stay anonymous and free of surveillance in public places. As illustrated above, those effects accurately outline people’s fear, scepticism, and distrust towards governmental drone usage.

Situational factors. To change the negative concept that opponents hold about drone usage, it is necessary to understand the situational factors that nurture this conception. In addition, it seems necessary to extract the aspects which might lead to an improvement in the way governmental drone usage is perceived. As outlined by Taylor (2010), people regard their safety as being more at stake when filmed in a private environment compared to a public place. An explaining factor for that might be people’s inferences. In their study, Van Rompay, De Vries and Damink (2015) found that CCTV surveillance was perceived as a sign of good intent in settings that were deemed more appropriate for its use, for instance, in a city centre. On the contrary, in a semi-public setting where the risk perception was rather low, CCTV cameras were perceived as unnecessary and thereby as intrusive and a sign of distrust. Hence, when people

are not able to infer a logical explanation for why a drone is present, drones might inspire irritation resulting in repulsion.

Transparency of information. Not only the general context in which a drone is present but also the provision of a logical explanation as to why it is present seems paramount. Research by Bennis, Goleman, and O'Toole (2008) showed that, in general, people feel more comfortable when situations and their possible outcomes are clarified. Incorporating timely, clear, and accurate information-disclosure strategies into ambiguous situations decrease people's' feeling of discomfort (Clark, 2008; Schnackenberg, & Tomlinson, 2016). As people might perceive drones as rather unfamiliar technology, provision of information might create a ground for acceptance (Apvrille, Roudier & Tanzi, 2015). Therefore, presenting people with different messages that contain varying degrees of informative and valuable content or superficial and meaningless content may incite different reactions to the presence of drones.

Trust. Moreover, transparent information about the reasons for and the intentions of the presence of drones might, in turn, lead to a higher level of trust, which might ultimately result in a more positive attitude towards drones. As research by Gefen, Karahanna, and Straub (2003) showed, trust is inevitable in establishing acceptance of new technologies. In specific, trust towards an organization as the government can be conceptualized via three attributes: goodwill, integrity, and competence of that organization (Mayer, Davis, & Schoorman, 1995). Goodwill can, in other words, be explained as benevolence and altruism. Integrity refers to the organization's strong foundation of and adherence to established principles. Lastly, competence encompasses the organization's skills and proficiency. Taken together, it can be concluded that the transparent provision of information regarding the presence of a drone should communicate the goodwill, integrity and competence of the organization responsible for it. That, in turn, might increase people's trust towards the organization, leads to drone acceptance.

Perceived control. Besides trust, another factor might play a major role in public drone acceptance. In general, in situations in which people are not able to predict outcomes, they often feel discomfort (Chamata, & Winterton, 2018). This discomfort can be explained in terms of not knowing what to expect and therefore not having control over the situation. Therefore, restoring that feeling of control by providing information, the situation might be perceived as less uncomfortable. In specific, people regain a sense of control when they feel capable of influencing and dealing with their surroundings. With respect to technology, a feeling of control regarding new devices might be achieved through user involvement as well (Baronas &, Louis, 1988). Having realistic expectations about objects and situations enables people to handle concerns and ambiguity. By involving users in the planning and the decision-making process

when developing new devices, individuals' sense of control and also overall acceptance towards the device might increase. Consequently, when organizations provide people with transparent information, their perceived control might increase and foster a higher level of acceptance.

Building upon that insight, it is assumed that for some people the effect on acceptance might be higher than for others due to specific character traits. How people experience various situations might not only depend on circumstantial factors but partially on dispositions. Meaning, in this context, that a person's general tendency to avoid uncertainty within a situation where a drone appears unexpectedly might influence the overall perception of the situation and thereby drone acceptance itself.

Need for control. A tendency for having a high need for control is conceptualized within the overall personality trait 'Openness to New Experiences'. This concept is embedded in basic human behavioural principles such as personal freedom and self-determination (Leotti, Iyengar, & Ochsner, 2010). Empirical and neurological evidence has established that people need control over their behaviour, environment, and outcomes. Therefore, for people with a high need for control, a sudden event such as the unexpected appearance of a drone can be very distressing and uncomfortable. As a result, this feeling of discomfort might decrease that individual's drone acceptance. Hence, the current study aims at investigating to what extent this assumption can be supported by empirical findings.

Uncertainty avoidance. Likewise, avoidance of uncertainty is also incorporated in the personality trait 'Openness to New Experience'. When a person scores low on 'Sensation Seeking' and 'Openness to New Experience', he or she is likely to score high on uncertainty avoidance (Hofstede, 1980). Thus, this person likes the familiar and has a preference for known risks rather than unknown ones (Ellsberg, 1961). By implementing those concepts, Engle-Warnick, Escobal, and Laszlo (2007) were able to establish which types of participants preferred what kind of technology and for what reason. Thus, the extent to which a person avoids uncertainty might be related to how likely he or she will accept a drone within different settings (Lidynia, Philipsen, & Ziefle, 2016). Especially of great interest is the interplay between uncertainty avoidance and the provision of transparent information. Based on these findings, one would expect that the greater the trait uncertainty avoidance in a person is, leads to a greater need for information in ambiguous situations.

Under normal circumstances, it is a person's own decision, whether he or she wants to be exposed to a certain kind of technology or not. Due to the fact that drones are automatic devices, controlled from a distance, they might invade people's environment without their approval. Since drones operate in a larger scope, privacy invasion to some extent is inevitable.

Regarding privacy invasion, especially people with characteristic traits of having a need to be in charge and in control as well as being uncomfortable with uncertainty are very challenged in these situations. Naturally, there are several other character traits that might play an influencing role. However, investigating these two is an interesting starting point.

During the last century, the amount of research in the field of drones was broadened due to the demand for gaining an understanding of how UVA's can be effectively implemented into society. However, systematic research investigating the underlying psychological mechanisms of drone acceptance within individuals is rather limited. Therefore, the additional focus of the current study lies on character traits, resulting in the following research question:

RQ 3: *To what extent do character traits such as 'Uncertainty avoidance' and 'Need for control' influence people's trust and perceived control and in turn affect drone acceptance?*

The Current Study

First of all, participants' general level of uncertainty avoidance and need for control was assessed by means of a questionnaire. Afterwards, participants were placed in one out of three VR settings - a park, a business area or a festival - and were asked to experience how they feel about watching a drone fly overhead. In the VR setting, participants had a phone with an app, which provided them with information about the drone. Provided information differed depending on the condition participants were randomly assigned to. That way transparency was manipulated. The effects of environment and transparency on trust, perceived control and drone acceptance were measured. The effects of these two personality traits on the relation between trust and drone acceptance and perceived control and drone acceptance were investigated as well. Based on the information provided above a conceptual model of this study was developed, displayed in Figure 1.

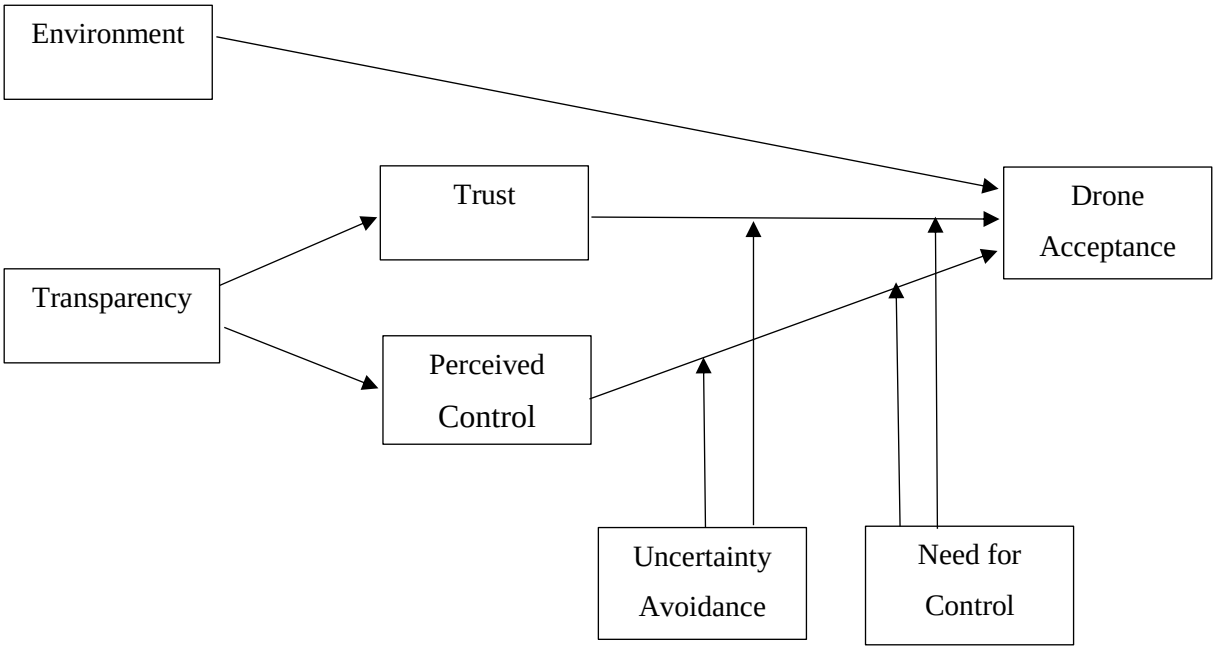

Figure 1. Conceptual model

Method

Participants

A total of 44 participants, whereby 25 (57%) being female and 19 (43%) being male, participated in this study. The age of the participants ranged from 18 to 28 years (M= 23, SD = 2). 36 (81.8%) of the participants were German, 6 (13.6%) were Dutch and 2 (4.5%) were from other nationalities. To be able to include as many participants as possible the questionnaire was administered in English. The sampling method can be described as an availability sampling drawing from the student pool of the University of Twente. Due to the fact that the participant recruitment did not proceed fluently, additionally, convenience sampling was conducted.

All of the participants are students at the University of Twente and received partial course credit on 'SONA' in exchange for participation. 32 of the participants live in Enschede or visit Enschede on a daily basis, whereby 12 of the participants just visit Enschede rarely. In order to be included in this research, participants needed to be at least 18 years old, speak and understand English on a moderate level and visit Enschede on an occasional level.

Participants were randomly allocated to two conditions (Transparency: yes versus no) within three environments (Environments: park versus business area versus festival event). From the total of 44 participants, 16 (36.4%) were assigned to the park condition, 13 (29.6%)

participants to the business area and 15 (34.1%) participants to the festival environment. The distribution can also be seen in Table 1, including the percentages.

Table 1.

Distribution of Participants among Environmental and Transparency Conditions

Environment	Park		Business area		Festival	
Transparency	Yes	No	Yes	No	Yes	No
n	9	7	8	5	8	7
Percentage	20.5%	15.9%	18.2%	11.4%	18.2%	15.9%
Marginal n	16		13		15	
Marginal %	36.4%		29.6%		34.1%	

Research Design

A procedure of random allocation by throwing a dice distributed the participants across a 2 (Transparency: yes versus no) x 3 (Environments: festival event versus business area versus regular park) between-participants design. The dependent variable of this experimental study is 'Drone acceptance'.

Materials

To make this research study possible, the research relied on the BMS lab of the University of Twente. The lab provided the researcher with the necessary equipment, namely the 'Occulus CV1' VR glasses and the PC with the Unity software to run the VR program. In the three environments, the 3D environment and its characters were built with Reallusion Iclone 7 and Character Creator 2.

Procedure

Before the study was conducted, the research got ethical approval from the ethical committee of the University of Twente. Firstly, participants were briefed by means of an introductory text about the experiment. However, the complete goal of the experiment was initially withheld. Additionally, participants were given some information about the study in general, regarding confidentiality, voluntary participation and duration. Subsequently, participants needed to agree to the informed consent in order to begin with the experiment. Before the VR exposure, participants needed to fill in the pre-questionnaire assessing their

personality traits. After filling in the questionnaire, participants were assigned to one of the three environments and one of the two conditions. Right before the VR glasses were handed over to the participants, they received some practical information on how to use the smartphone within the VR. The smartphone provided specific information depending on the condition the participant was assigned to.

Environment. Participants were assigned to one of three virtual environments and given a VR headset. The VR scenario that appeared was either situated in a park, a business area or a festival event. The different environments are illustrated in Figure 2. Participants were positioned on a fixed spot and instructed that they could look around freely and use their hands in order to get acquainted with the VR. Depending on the condition the participants were assigned to, they were either informed or not informed that the drone belonged to the Municipality of Enschede. After a certain period of time (90 seconds) the app disappeared, and the sound of a flying drone appeared, followed by the drone itself. The drone flies above their heads a couple of times and then flies by. After telling the participants that the VR is going to stop, the experiment was terminated by the researchers.

Figure 2. Environmental conditions: park (top), business area (middle), festival (bottom).

Transparency. Right after being released into the VR participants got some time to get acquainted with their surroundings. In the previous study conducted by Oltvoort et. al (2019) the validity of the study was at stake due to the 'Novelty factor'. This factor can be defined as the initial 'Wow-effect' of new technology as being exposed to VR for the first time. Under the influence of that factor, in the previously conducted study participants were overwhelmed by the setting itself and did not notice the drone flying above their heads. Thus, this time it was essential to give participants some time (about 20 seconds) to get acquainted with the VR.

After 20 seconds after being released in the VR, all participants received a push notification of the 'Municipality of Enschede Drone Information App'. Depending on whether they were assigned to the transparent information condition or the no transparent information condition, the message they received was different. In the transparent condition participants received information about who is responsible for the drone's presence, what exactly is the reason why the drone is present, how is the drone collecting information, what is happening to that information, therefore privacy-related issues, seeing what kind of footage is collected by the drone and a possibility to give feedback. The app was supposed to enhance the level of transparency and perceived control by providing information (extract: 'The sensors of the drones are capable of recognizing certain behaviours. When drones are recognising such behaviour, our security stuff gets a warning.'). The complete displayed text is shown in Appendix A. Additionally, Figure 3 captures screenshots of each condition.

Within the 'no transparency' condition participants were placed in one of the three VR environments as well. In this condition they did not receive a push notification from the 'Municipality of Enschede Drone App' but one with a complete neutral message ('Hi, how are you today doing today? Did you already take a look around you, to see in what environment

you are?'). Similar to the transparency condition the message disappeared after 60 seconds. Afterwards, the drone appeared and flew by. After the participant noticed the drone for several seconds and experienced its presence, the VR was terminated. Figure 3 shows the Transparency conditions.

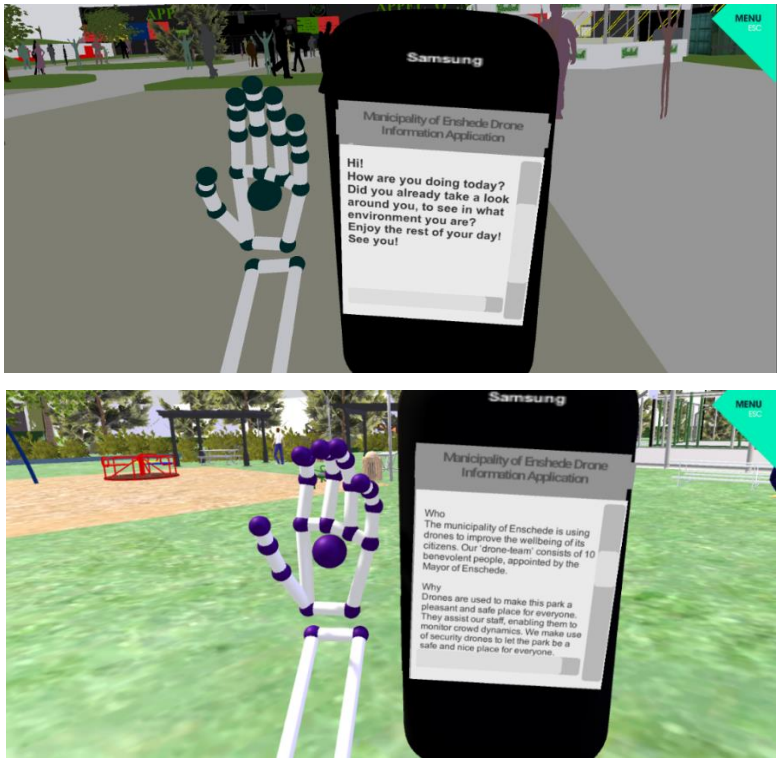

Figure 3. Transparency conditions: No transparency (top) and transparency (bottom).

Subsequently, participants of both conditions received the questionnaire described in the section Measures. Finally, after completing the questionnaire the participants were debriefed and the actual goal of the study was disclosed.

Due to technical issues on the part of the VR equipment towards the end of the data collection period, the transparency condition was used for the no transparency condition. Participants were asked to disregard the information by not using their left hand, to which the virtual phone was attached.

Measures

Two questionnaires, a pre- and a post-questionnaire were created and composed in order to measure intended variables as uncertainty avoidance, need for control, perceived

transparency, trust, perceived control, drone acceptance and privacy. The pre-questionnaire can be found in Appendix B and the post-questionnaire in Appendix C.

Uncertainty Avoidance. The intention of the first questionnaire was to measure the participants' overall tendency to avoid uncertainty. By means of an already existing scale by Jung and Kellaris (2004), the extent to which participants avoided uncertainty was assessed with six items (e.g. 'I feel stressed when I cannot predict consequences'; Cronbach's alpha = .86, Guttman's lambda = .86). Participants needed to state their level of agreement on a 7-point Likert scale.

Need for control. The overall level participants have a need for control over a situation was assessed by means of twenty items (e.g. 'When I see a problem I prefer to do something about it rather than sit by and let it continue'; Cronbach's alpha = 0.81; Guttman's lambda = .83). This scale was borrowed from Burger and Cooper's 'Desirability of Control' Scale (1979). Participants were asked to rate their agreement to these statements on a 7-point Likert scale. Both of these scales above-mentioned scales assess partial elements of the overall personality trait 'Openness to New Experience'. It is one of the Big Five personality traits (McCrae, & Costa, 1987).

The post-questionnaire, filled in by the participants after the VR exposure is assessing five different concepts, namely (Perceived transparency, trust, perceived control, drone acceptance and privacy). Subsequently, five questions about demographics (age, gender, level of education, residence, frequency of visiting Enschede) were followed by six statements as manipulation checks for the three environments.

Perceived Transparency. The level of transparency, perceived by the participants towards the municipality of Enschede was measured by using a 7-point Likert scale (ranging from 1= strongly agree to 7= strongly disagree). The items of the scale were composed by the research paper of Rawlings (2008). The level of agreement to the items was measured on four items such as 'The municipality of Enschede wants people like me to know what it is doing and why it is doing it' (Cronbach's alpha = .76; Guttman's lambda = .77).

Trust. In order to assess participants' level of trust towards the municipality of Enschede, the concept was divided into four subcategories: goodwill, integrity, competence and overall trust. Similarly, they were measured using a 7-point Likert scale. Goodwill was measured with three items (e.g. 'The municipality of Enschede is interested in the well-being of people like me, not just itself'; Cronbach's alpha = .82; Guttman's lambda = .82). Integrity was measured with four items (e.g. 'Sound principles seem to guide the behaviour of the municipality of Enschede'; Cronbach's alpha = .86; Guttman's lambda = .86) and competence

with three items (e.g. ‘I feel very confident about the skills of the municipality of Enschede’; Cronbach’s alpha = .74; Guttman’s lambda = .74). Lastly, the overall trust was assessed with three items as well (e.g. ‘I trust the municipality of Enschede to take care of people like me’; Cronbach’s alpha =.67, Guttman’s lambda = .69). The overall Cronbach’s alpha and Guttman’s lambda for the whole scale assessing the trust towards the municipality of Enschede is respectively .92 and .92.

Perceived control. Based on the work by Ouwehand, De Ridder and Bensing (2006) the level of perceived control was measured. By using a 10-point Likert scale (ranging from 1= not at all to 10= a great deal) perceived control was assessed by means of agreement on five items (e.g. ‘To what extent did you feel you could predict the situation?’; Cronbach’s alpha = 0.60; Guttman’s lambda = .65).

Drone acceptance. In order to be able to measure the overall level of drone acceptance of the participants, the ‘Acceptance Scale’ of Van der Laan, Heino and De Waard (1997) was used but partially adjusted. It was intended to measure participants acceptance towards the use of drones by the municipality of Enschede by means of nine Likert scale items (e.g. ‘My judgements of the drone of the municipality of Enschede are …: Pleasant - Unpleasant’; Cronbach’s alpha = .84; Guttman’s lambda = .87)

Drone acceptance among environments. To be able to measure drone acceptance among the three different environments, participants needed to answer two items per each environment (park, business area, festival event). All of the participants needed to rate their agreement on a 7-point Likert scale, independent from the environment they were placed in (e.g. “It is logic that the municipality of Enschede uses drones at parks.” and “I understand why the Municipality of Enschede uses drones at parks.”).

Privacy. Lastly, the level of perceived privacy was assessed as well. However, this variable and its outcomes are beyond the scope of this research paper.

Data-Analysis

In order to find out whether drone acceptance can be affected by Transparency and Environment manipulations and to what extent the above-stated variables (trust, perceived control, need for control, uncertainty avoidance and perceived transparency) have an influence, various analyses were conducted. First of all, an overview of the descriptive statistics of the study is provided. Additionally, the correlations between the main variables are stated and depicted in table 1. Secondly, a Multivariate ANOVA with all main variables was conducted in

order to investigate all main effects. Lastly, a repeated measures ANOVA was conducted to examine whether drone acceptance different among the different environments.

Results

Preliminary Analysis

Participants visited Enschede on average at least once a week or on a daily basis. All of the participants had at least a higher secondary education (e.g. HAVO; VWO; Abitur). Perceived transparency (M =3.60, SD = 1.13), trust (M = 3.50, SD = 0.91), perceived control (M = 2.93, SD = 1.10), need for control (M =3.09, SD = 0.61) and uncertainty avoidance (M = 3.41, SD = 1.09) had mean values approximately average or above average. The outcome variable drone acceptance (M = 3.92, SD = 0.88) ranged from values of 2.11 to 5.78.

The correlation analysis revealed four significant correlations between one of the main variables and trust. First of all, trust is significantly positively correlated with perceived transparency [$r(44) = .34$, $p = .026$] and drone acceptance [$r(44) = .44$, $p = .003$]. Additionally, perceived control is significantly negatively correlated with trust [$r(44) = -.41$, $p = .005$]. Furthermore, a significant correlation between uncertainty avoidance and perceived control is shown as well [$r(44) = .32$, $p = .034$]. The descriptive statistics and the correlations for all main variables (IV: Perceived transparency, DV: trust, perceived control, need for control, Covariates: uncertainty avoidance and acceptance) can be found in Table 2.

Table 2.

Means, Standard Deviations and correlations of the main variables.

	N	*M*	*SD*	1.	2.	3.	4.	5.	6.
1. Perceived transparency	44	3.60	1.13	-	.23	.34*	-.27	-.16	.14
2. Drone acceptance	44	3.92	0.88	.23	-	.44**	-.28	-.11	.11
3. Trust	44	3.50	0.91	.34*	.44**	-	-.41**	.24	.28
4. Perceived control	44	2.93	1.10	-.27	-.28	-.41**	-	.32*	-.13
5. Uncertainty avoidance	44	3.42	1.09	-.16	-.11	.24	.32*	-	-.21
6. Need for control	44	3.09	0.61	.14	.11	.28	-.13	-.21	-

Note. Pearson's *r* was calculated to examine the association between all other variables. *$p < .05$. **$p < .001$.

Effects of Environment and Transparency on Main Variables

In order to examine whether the environment had a significant effect on participants' drone acceptance and whether transparent information disclosure strategies had a significant effect on the level of trust towards the Municipality of Enschede, the level of perceived control and the level of drone acceptance, a Multivariate ANOVA was conducted. Environment and Transparency were chosen as independent variables and perceived transparency, trust, perceived control and drone acceptance as dependent variables.

The results showed a non-significant main effect of Environment, $F(8,52) = 1.025$, $p = .430$, Wilk's $\lambda = .746$. Furthermore, no significant main effect of Transparency was found as well, $F(4, 26) = 1.904$, $p = .140$, Wilk's $\lambda = .773$. The lack of the effect of Transparency on perceived transparency clearly indicates that the manipulation did not produce the desired results, $F(4,27) = 0.442$, $p = .647$. When using Perceived transparency as the independent variable instead of the condition variable Transparency, no significant main effects were found as well. Therefore, no mediation effect between Perceived transparency and drone acceptance by means of trust and perceived control could be stated. All main effects are displayed in Table 3. Due to these findings, the following analyses were conducted in a more exploratory manner, by taking into consideration for instance interaction effects.

Table 3.

Multivariate Effects of Environment and Transparency

Variables	Wilk's λ	*F*	*p*	*df*	*df* error
Environment	.746	1.025	.430	8	52
Transparency	.773	1.904	.140	4	26
Transparency*Environment	.562	2.174	.045*	8	52

Note. Pearson's *r* was calculated to examine the association between all other variables. *$p < .05$.

Taken into consideration the non-significant correlational findings, there was a need to conduct a power analysis, in order to be able to proceed with the analysis. To check whether the non-significant findings were due to a lack of statistical power, a post hoc analysis was conducted using the program G*Power (Erdfelder, Faul & Buchner, 1996). Due to the modest sample size in this study (N = 44), the significance of some of the statistical comparisons and analysis might be limited. With power (1-β) set at 0.80 and $\alpha = 0.5$, two-tailed, the analysis showed that the sample size is in need to be increased up to 68 participants, for effect differences to reach significance at the level of 0.5. Thus, it is likely that the negative findings can be attributed to a limited sample size.

Since Environment and Transparency did not have a direct effect on drone acceptance, the interaction between these two independent variables was investigated. The results showed a significant main effect of the interaction of Environment and Transparency, $F(8,52) = 2.174$, $p = .045$, Wilk's $\lambda = .562$. Significant univariate effects were found on one dependent variable namely drone acceptance, $F(8,52) = 6.210$, $p = .006$. Pairwise comparison revealed a marginally significant effect within the park condition ($p = .079$) and a significant effect within the festival condition ($p = .012$). This finding is contradictory to the expected outcome of this study. This finding is depicted in Figure 4.

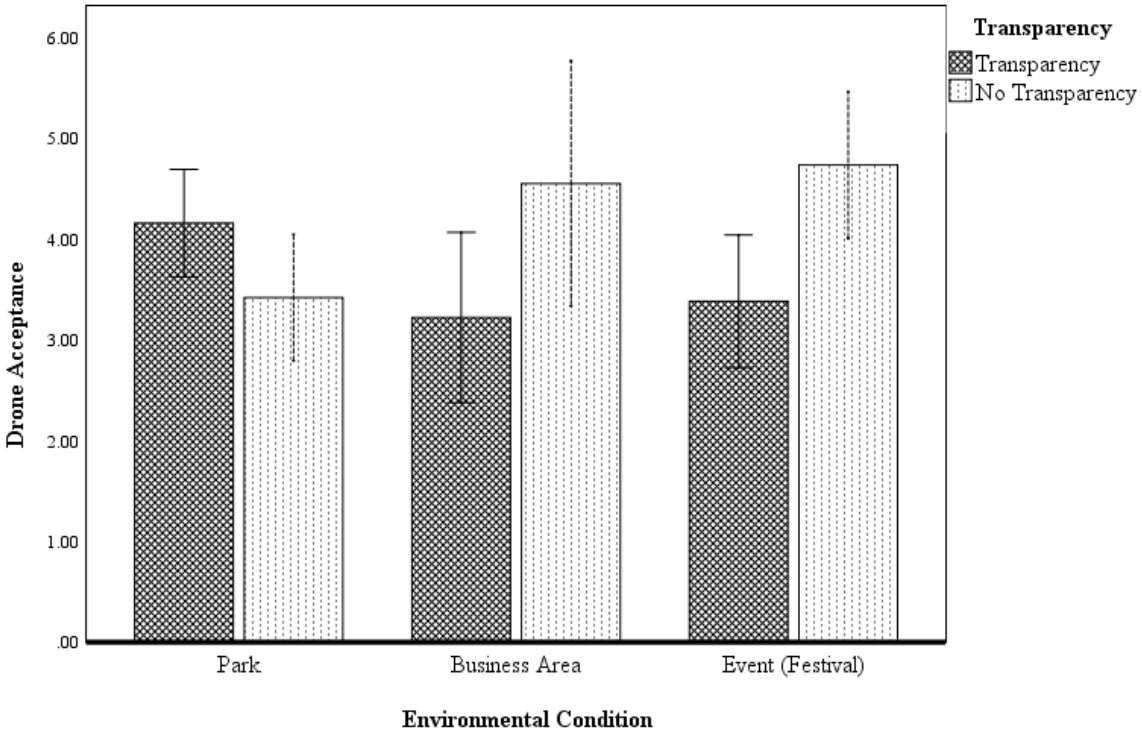

Figure 4. Effects of Transparency on drone acceptance among the three environments

Effects of Environment on Uncertainty Avoidance and Need for Control

Since it was expected that uncertainty avoidance and need for control would have main effects a second Multivariate ANOVA was conducted with Environment and Transparency as IV and trust, perceived control and drone acceptance as DV and uncertainty avoidance and need for control as covariates. Due to the fact that no main effects could be found, more explorative analyses including interaction effects were conducted. Thereby, an interaction effect of Environment and uncertainty avoidance could be found $F(8,52) = 2.798$, $p = .012$, Wilk's $\lambda =$

.489. Significant univariate effects were determined on two dependent variables namely, on trust $F(8,52) = 6.366$, $p = .005$ and on drone acceptance $F(8,52) = 6.910$, $p = .004$. All main effects are displayed in Table 4.

Table 4.

Multivariate Effects of Need for Control and Uncertainty Avoidance

Variables	Wilk's λ	*F*	*p*	*df*	*df* error
Need for Control	.809	1.538	.220	4	26
Uncertainty Avoidance	.872	0.950	.451	4	26
Environment*Uncertainty Avoidance	.489	2.798	.012*	8	52

Note. Pearson's *r* was calculated to examine the association between all other variables. *$p < .05$.

Therefore, a correlation analysis was conducted in order to investigate the relationship between uncertainty avoidance and trust among the three different environments. However, no significant correlations were found. Nevertheless, while investigating the second significant univariate effect, the interaction of Environment and uncertainty avoidance on drone acceptance, significant correlations can be stated. Uncertainty avoidance and drone acceptance were significantly negatively correlated within the park condition [$r(14) = -.517$, $p = .04$], positively correlated within the business condition [$r(14) = .154$, $p = .615$] and negatively correlated within the festival condition [$r(14) = -.006$, $p = .984$].

Effects of Drone Acceptance among Environments

While filling out the questionnaire participants were asked to indicate for each environment (park, business or festival) whether they considered drones acceptable in these environments. A repeated measures ANOVA was conducted in order to be able to compare different acceptance scores among the three environments. The acceptance score within festival environment was the highest ($M = 4.87$, $SD = 1.42$), followed by business areas ($M = 3.80$, $SD = 1.55$). The lowest acceptance score among environments was within the park condition ($M = 3.13$, $SD = 1.37$). Moreover, the analysis indicated a significant effect on the three different environments. [$F(2,42) = 35.99$, $p < .01$, Wilk's $\lambda = .37$].

In order to further examine this result, a follow-up pairwise comparison analysis was conducted. The results showed that drones were significantly more accepted during festivals compared to business areas ($M_{difference} = 1.08$, $SE = 0.22$, $p < .001$). Additionally, the level of

drone acceptance was also higher within festivals compared to parks ($M_{difference}$ = 1.75, *SE* = 0.20, $p < .001$). Lastly, the outcomes showed that drones were also significantly more accepted at business areas compared to parks ($M_{difference}$ = 0.67 *SE* = 0.20, $p = .005$).

Discussion

The present study examined whether people's degree of drone acceptance varies in different environments and whether it is affected by the transparency of the respective information they receive. This study was a replication of the research conducted by Oltvoort et. al (2019). The aim was to support their findings and extend them by incorporating the influence of both uncertainty avoidance and need for control. As with the original study, direct manipulation of the environment and transparency conditions did not succeed. Therefore, no straightforward answer to the first and second research questions can be given. However, it was found that the environment and transparency together influenced drone acceptance.

Neither the environment and nor the information-disclosure strategies influenced drone acceptance on their own. However, their joint effect had a significant influence on the participants' level of drone acceptance. Furthermore, the analysis revealed an unexpected result within the festival condition. When transparent information was provided, people's drone acceptance decreased. This finding contradicts the initial expectation of this study, being that provision of transparent information in general increases drone acceptance.

This outcome might be explained by people's privacy concerns mentioned in the very beginning. Custers (2016) already listed some privacy concerns and some related aversions toward surveillance technology. Here, the three effects named by Custers (2016), namely being self-conscious, people's fear of abuse of technology by the government, and the right to not be identified when moving in public, might interact with each other and have an effect on the overall finding. It could be that, normally people do not notice drones at festivals due to circumstantial factors as music and the interaction with other people. The provision of information might result in unintentionally shifting the focus of attention exclusively on the drone. As Van Rompay, De Vries and Damink (2015) already established, whether a surveillance device seems as appropriate is strongly environment dependent. Since the notification mentions that the drone is sent by the Municipality of Enschede, people might feel monitored by the government in their free-time without having given their permission.

On a societal level, this finding has a special implication. The incorporation of drones into surveillance, adds a new dimension of promises and threats, both figuratively and literally

(Clarke, 2014). Feeling highly uncomfortable about the government's use of technology as outlined by Custers (2016), especially fear of governmental abuse of such technology might ultimately result in losing trust in the government. This becomes especially relevant considering the major role that drones play in plans about future connected smart cities (Vattapparamban, Guvenc, Yurekli, Akkaya & Uluagac, 2016). High degrees of distrust toward governmental use of technology paired with increasing incorporation of governmental use of technology in everyday life could create an ever-increasing gap between the populace and their government (Margalit, 2019). This may ultimately climax to a point of radicalisation. Thus, it seems of paramount importance to ensure the populace's acceptance of governmental drone use and weigh the advantages and disadvantages of it against each other, The consequences of implementing it against the will of the people could bear dire consequences.

In line with the level of drone acceptance and different setting can also the following finding be discussed. The extent to which people regarded the presence of drones as more appropriate and acceptable varied depending on the setting they were placed in. The presence of drones was more acceptable during festivals as compared to both business parks and neighbourhood parks. Equally, drones were more accepted within business parks than neighbourhood parks. Firstly, these results confirm the findings of Oltvoort et. al (2019). Secondly, it could be interpreted that the less private participants perceived their environment to be, the less they were bothered by the presence of a drone. However, additional measures about how private they actually perceived these different environments are needed, in order to be able to rightfully draw this conclusion. All in all, it seems that the degree to which people experience drone usage as appropriate is dependent on the environment they are situated in.

Moreover, as expected, drone acceptance was found to be associated with trust. Thus, an assumption could be made that if public safety services were able to increase people's trust in the organization, it could foster people's drone acceptance more readily. It should be noted, however, that this relationship between trust and drone acceptance is of purely correlational nature and no causation can be implied from the present finding. The reverse effect, that drone acceptance in the first place leads to an increased level of trust in the organization could also be the case. Nevertheless, according to Li, Hess, and Valacich (2008) trust precedes the acceptance and usage of new technological devices. It, therefore, stands to reason that trust towards the organization might indeed be a factor that highly influences drone acceptance.

Furthermore, the results showed an unexpected association between perceived control and people's trust in the organisation that employs the drone. This finding is surprising due to the fact that both variables were expected to serve as mediators. Moreover, this correlational

relation was negative. Accordingly, the more a person feels capable of influencing possible outcomes within a situation, the lower his or her level of trust towards the organization will be. Various researchers have established that perceived control and trust jointly affect different factors like perceived risk, perceived usefulness or perceived loyalty towards an organization (Chang, & Hsu, 2019; van Dongen, Claassen, Smid, & Timmermans, 2013). Additionally, recent research by Garcia-Madariaga, Recuero Virto, Blasco López and Aldas Manzano (2019) confirmed the assumption that perceived control has a positive influence on trust. Contrary to scientific literature, the results of this study show a negative relationship between perceived control and trust. This calls for further investigation into this relationship. Future research should clarify how these factors interact. Considering that drone acceptance might be positively influenced by trust, as mentioned above, it should be examined whether perceived control functions as an independent variable which influences drone acceptance mediated by trust.

Additionally, trust was positively associated with perceived transparency. This finding confirms the relationship expected by the literature (Apvrille, Roudier, & Tanzi, 2015; Mayer, Davis, & Schoorman, 1995). It is a very important finding, on which future research can base its examination of the causational relationship of it. If the provision of information would indeed lead to a higher level of trust towards the organization, the safety sector implementing the drones could already make use of that insight, in order to create a greater drone acceptance among the people concerned.

One finding of the present study was the overall relevance of uncertainty avoidance. A positive relationship was found between this character trait and perceived control. This seems like a contradicting finding, mostly uncertainty would be negatively associated with perceived control. However, this finding can be open to speculation. It might be the case that one could imply that if a person has an internal need for clarity and structure, he or she is more prone to attempt to take control over their current situation in order to feel a sense of clarity. As research by Wang, Xia, Yao, and Huang (2016) emphasizes, not only character traits might play a role in the perception of control but also cultural factors. They found out that cultural background can determine to what extent people are sceptical about surveillance. As Hofstede (1980) already implied, different cultures also vary in their score on the Uncertainty Avoidance Index. Hence, one could speculate that Asian people might feel more uncomfortable by the presence of a drone than European. Moreover, it would be interesting to investigate whether there exists a relationship between perceived control, uncertainty avoidance and cultural elements.

As already mentioned at the beginning of the discussion, participants were less likely to accept drones in the park condition as compared to the other two conditions. A possible

explanation might be that people feel more private in a neighbourhood park than in crowded places. This assumption is supported by the negative relationship between drone acceptance and uncertainty avoidance found in the park condition. People who are uncertainty avoidant would, thus, be less likely to accept a drone flying overhead in a private setting such as a park. Suddenly spotting a drone, especially in a calm and relaxing environment such as a park, might be a highly stressful experience for people. This would be particularly the case for highly uncertainty avoidant individuals.

Looking at the findings of the present study, people's character traits combined with the environment a drone appears, seem to be more relevant when examining the degree to which people accept the drone than the environment alone. Consequently, research should focus on, for instance, how different levels of uncertainty avoidance affect people's drone acceptance in different settings. Does it make more of a difference whether a person with a high or low level of uncertainty avoidance scores high or low on drone acceptance across different environments? The focus on the interaction between dispositional and environmental factors is a common and important approach in empirical research. The outcomes of this study showed once more that investigating dispositional and environmental factors separately does not produce the desired results because of their inevitable and essential impact on each other.

Implications. These research findings show the overall important roles perceived control, trust, uncertainty avoidance and environmental conditions play in drone acceptance, by being partially intertwined with each other. Since investigating individual characteristics paired with situational factors provides us with new insights, a completely new component, namely the emotional could be taken into consideration in the future. For instance, the assessment of fear regarding new technology and different fear reducing strategies as exposure could be incorporated. Consequently, seeing how fear is affecting the different relationships between the variables assessed in this study might be of interest for future researchers.

In addition to that, even though the provision of information did not have a direct effect, it should, however, be further investigated in future research, partially due to its significant relationship with trust. When individuals are provided with information, trust, perceived control, as well as uncertainty avoidance and possibly fear, might be affected.

Limitations. Minor problems regarding the implementation of the current study resulted in some limitations. In terms of VR experience, technical improvement of the scenarios might contribute to more accurate outcomes in future research. Especially the festival condition lacked real-life atmosphere and social dynamics. As a suggestion for improvement music and interaction with others should be included in that condition. It is assumed that the negative

perception of a drone on a 'real-life' festival would be downsized, for reasons of distraction due to enjoyment. Moreover, the sample size of this study was very modest for reasons of time limitations. The power analysis revealed that in order to be absolutely sure inferring significant findings within this study a sample size of at least 65 participants is needed. Nevertheless, by working on these shortcomings, future VR studies with a greater pool of participants should be able to achieve stronger effects and therefore even more valuable findings.

Conclusion

The first aim of the present study was to examine how drone acceptance is affected by environments and information transparency. Based on the quantitative analysis of the influence of trust and perceived control on drone acceptance, manipulated by environmental and transparency conditions, several conclusions can be drawn.

Even though the environmental and transparency manipulation did not affect drone acceptance separately, their interaction did, providing valuable insights. First of all, it underscores the importance of the interactive component between the environment and transparency. Due to the limited sample size, this study asks for replication in order to confirm the assumption that drone acceptance varies dependent on situational factors and the transparency of provided information. Especially interesting was the finding that even though participants are prone to accept drones in more public places, in this study drone acceptance decreased within the festival condition when provided with transparent information. This finding contradicted the intentions and expectation of this study.

Secondly, the research aimed to investigate the effect of dispositional traits, such as uncertainty avoidance and need for control on the relationship between trust, perceived control and drone acceptance. Unfortunately, the study was not able to find any valid indications that an individual's level of need for control influences drone acceptance. However, several analyses supported the assumption that uncertainty avoidance does play a role. It indeed is associated with a person's level of perceived control. Additionally, depending on the environment, the level of uncertainty avoidance of a person does affect drone acceptance. The findings provide a first step towards the investigation of dispositional factors influencing drone acceptance.

Thirdly, trust in the organization seems to play an important role in drone acceptance. The causational nature of this significant finding should be investigated in order to adjust the conceptual model in a way that perceived control could serve as an independent variable itself, while trust can be used as a mediator variable and drone acceptance as a dependent one.

All in all, the focus should lie on the societal implications that might arise through drones serving as surveillance devices. Since the advantages of incorporating drones in various domains are perceived as being immense, the process is in motion and most likely past the point of return. However, the gap between proponents and opponents of governmental drone usage still exist. By conducting this research, organizations might be enabled to incorporate drones in a way most comfortable for every party involved. ‘The drones are coming’, therefore, further investigation of whether fostering trust towards the governmental organizations, perceived control, as well as the impact of cultural and dispositional elements, might influence drone acceptance in the long run. It might result in overall public drone acceptance, being beneficial for all parties involved.

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Appendix A

Who

The municipality of Enschede is using drones to improve the wellbeing of its citizens. Our ‘drone-team’ consists of 10 benevolent people, appointed by the Mayor of Enschede.

Why

Drones are used to make this park a pleasant and safe place for everyone. They assist our staff, enabling them to monitor crowd dynamics. We make use of security drones to let the park be a safe and nice place for everyone.

How

Our drone is able to recognize risky situations and risky behaviours. When this happens, our security staff will receive a warning. Also, drones could help prevent congestion when the business park should be evacuated for example.

Privacy

We take the privacy of our visitors very seriously. We can assure you that we are not interested in detecting individuals and we are also not capable of detecting individuals. Our drone is filming from above, so in the footage we can only see people from above, which makes it impossible to recognize individuals.

Images/map

Here you can see what kind of footage we collect with our drones. And here you can see the route our drone travels:

Feedback

Here you can ask questions or give us feedback. We will respond as soon as possible.

Appendix B

Informed Consent

You are invited to participate in our research study titled
'*Being filmed by a drone violates your privacy...right?*'.

The purpose of this study is to investigate which factors might influence drone acceptance in general and will take approximately 30 minutes. Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to ask questions whenever they emerge. The risks associated with the study might be minor physical discomfort (headache) if being exposed to the VR for too long. This is hopefully not going to be the case in this study. The data of this study is used as findings for a bachelor thesis topic. Your personal information is going to be handled confidentially and will not be shared with anyone beyond the study team. By agreeing with this informed consent, you agree that your anonymized information is going to be shared with researchers for future studies. This information is not going to include any information that could identify you directly.

Do you agree to participate under the conditions mentioned above?

Yes, I consent with participation in accordance with the information above.

Appendix C

Pre-Questionnaire

Uncertainty Avoidance and Need for Control (7-point Likert Scale)

Q1: "There are many situations in which I would prefer only one choice rather than having to make a decision."

Q2: "I prefer to avoid situations where someone else has to tell me what it is, I should be doing."

Q3: "When driving, I try to avoid putting myself in a situation where I could be hurt by someone else's mistake."

Q4: "I wish I could push many of life's daily decisions off on someone else."

Q5: "When it comes to orders, I would rather give them than receive them."

Q6: "When I see a problem, I prefer to do something about it rather than sit by and let it continue."

Q7: "I like to get a good idea of what a job is all about before I begin."

Q8: "I'd rather run my own business and make my own mistakes than listen to someone else's orders."

Q9: "I consider myself to be generally more capable of handling situations than others are."

Q10: "I would rather someone else took over the leadership role when I'm involved in a group project.”

Q11: "I enjoy having control over my own destiny."

Q12: "I enjoy making my own decisions."

Q13: "Others usually know what is best for me."

Q14 "I am careful to check everything on an automobile before I leave for a long trip."

Q15: "I enjoy being able to influence the actions of others."

Q16: "I would prefer to be a leader rather than a follower."

Q17: "I try to avoid situations where someone else tells me what to do."

Q18: "I enjoy political participation because I want to have as much of a say in running government as possible."

Q19: "I prefer a job where I have a lot of control over what I do and when I do it."

Q20: "I prefer situations, in which I can anticipate the course of events over situations where I cannot."

Q21: "I do not like ambiguous situations."

Q22: "I would not take risks when an outcome cannot be predicted."

Q23: "I feel stressed when I cannot predict consequences."

Q24: "I tend to get anxious easily when I do not know an outcome."

Q25: "I prefer specific instructions to broad guidelines."

Q26: "I prefer structured situations to unstructured situations."

Q27: "I like to wait and see if someone else is going to solve a problem so that I do not have to be bothered by it."

Appendix C

Post-Questionnaire

Transparency (7-point Likert Scale)

Q1: “The municipality of Enschede wants to understand how its decisions affect people like me.”

Q2: “The municipality of Enschede provides information that is useful to people like me for making informed decisions.”

Q3: “The municipality of Enschede wants to be accountable to people like me for its actions.”

Q4: “The municipality of Enschede wants people like me to know what it is doing and why it is doing it.”

Goodwill (7-point Likert Scale)

Q5: “Whenever the municipality of Enschede makes a decision I know it will be concerned about people like me.”

Q6: “I believe the municipality of Enschede takes the opinions of people like me into account when making decisions.”

Q7: “The municipality of Enschede is interested in the well-being of people like me, not just itself.”

Integrity (7-point Likert Scale)

Q8: “The municipality of Enschede treats people like me fairly and justly.”

Q9: “The municipality of Enschede can be relied on to keep its promises.”

Q10: “Sound principles seem to guide the behaviour of the municipality of Enschede.”

Q11: “The municipality of Enschede does not mislead people like me.”

Competence (7-point Likert Scale)

Q12: “I feel very confident about the skills of the municipality of Enschede.”

Q13: “The municipality of Enschede has the ability to accomplish what it says it will do.”

Q14: “The municipality of Enschede is known to be successful at the things it tries to do.”

Overall Trust (7-point Likert Scale)

Q15: “I'm willing to let the municipality of Enschede make decisions for people like me.”

Q16: “I think it is important to watch the municipality of Enschede closely so that it does not take advantage of people like me.”

Q17: “I trust the municipality of Enschede to take care of people like me.”

Privacy (7-point Likert Scale)

Q18: “I would like to keep photos of my family on the internet.”

Q19: “I’d object to my photograph appearing in a public place without my permission.”

Q20: “I would put my photo on my personal web page.”

Q21: “No organization or person should disseminate personal information about me without my knowledge.”

Q22: “I would not mind appearing on television.”

Q23: “Video cameras should be used in public places to improve public safety and security.”

Q24: “Red light (intersection) cameras should be used.”

Q25: “Speeding cameras should be used.”

Q26: “I like to close my curtains at home at night.”

Q27: “I worry about the possibility that my conversations will be overheard.”

Q28: “I am comfortable in allowing others to check my credit.”

Q29: “It usually bothers me when companies ask me for personal information.”

Q30: “When companies ask me for personal information, I sometimes think twice about providing it.”

Q31: “It bothers me to give personal information to so many companies.”

Q32: “I’m concerned that companies are collecting too much personal information about me.

Q33: “Companies should take more steps to make sure that unauthorized people cannot access personal information.”

Q34: “Computer databases that contain personal information should be protected from unauthorized access—no matter how much it costs.”

Q35: “Companies should not use personal information for any purpose unless it has been authorized by the individuals who provided the information.”

Q36: “Companies should never sell the personal information in their computer databases to other companies.”

Q37: “The use of drones as surveillance reduces crime.”

Q38: “The use of drones as surveillance is an invasion of privacy.”

Q39: “The use of CCTV is an invasion of privacy.”

Perceived Control (10-point Likert scale)

Q40: “To what extent did you feel you had control over the situation?”
Q41: “To what extent did you feel you could predict the situation?”
Q42: “To what extent did you feel you had a choice in the situation? In other words: did you feel that you could chose to come, or to not come into contact with the drone of the municipality of Enschede?”
Q43: “To what extent did you feel responsible for the situation, caused by the municipality of Enschede?”
Q44: “Did you feel like you were able to influence the situation? In other words: did you feel that you had a say in the use of a drone by the municipality of Enschede? (5)

Drone Acceptance (7-point Likert scale)

Q45: “To what extent do you accept the use of drones by the municipality of Enschede? My judgments of the drone of the municipality of Enschede are ...”

Q45.1: “Useful – Useless”
Q45.2: “Pleasant – Unpleasant”
Q45.3: “Bad – Good”
Q45.4: “Nice – Annoying”
Q45.5: “Effective – Superfluous”
Q45.6: “Irritating – Likable”
Q45.7: “Assisting – Worthless”
Q45.8: “Undesirable – Desirable”
Q45.9: “Raising alertness - Sleep-inducing”

Drone Acceptance among Environments (7-point Likert scale)

Q46: “In the following please indicate your agreement with some statements concerning the use of drones during **events**.”
Q46.1: “It is logic that the Municipality of Enschede uses drones during events.”
Q46.2: “I understand why the Municipality of Enschede uses drones during events.”

Q47: “In the following please indicate your agreement with some statements concerning the use of drones during **parks**.”

Q47.1: “It is logic that the municipality of Enschede uses drones at parks.”

Q47.2: “I understand why the Municipality of Enschede uses drones at parks.”

Q48: “In the following please indicate your agreement with some statements concerning the use of drones during **business parks**.”

Q48.1: “It is logic that the Municipality of Enschede uses drones at business parks.”

Q48.2: “I understand why the Municipality of Enschede uses drones at business parks.”

Demographics

Q49: “What is your age?”

Q50: “What is your gender?”

Q51: “What is your highest completed level of education?”

- Q51.1: “Primary School (Lagere School; Grundschule)”
- Q51.2: “Secundary education (e.g. VMBO; MAVO; Realschule)”
- Q51.3: “Higher secundary education (e.g. HAVO; VWO; Abitur)”
- Q51.4: “Intermediate vocational education (e.g. MBO; Berufsfachschule)”
- Q51.5: “Higher vocational education (e.g. HBO; Fachhochschule)”
- Q51.6: “Bachelor's degree”
- Q51.7: “Master's degree”
- Q51.8: “Doctoral degree”
- Q51.9: “Other:”

Q52: “What is your place of residence?”

Q53: “How often do you visit Enschede?”

- Q53.1: “On a daily basis”
- Q53.2: “On a weekly basis”
- Q53.3: “On a monthly basis”
- Q53.4: “A couple of times per year”
- Q53.5: “Once per year or less”

Debriefing

Thank you for participating in this study!

The entire goal of this study was to find out whether respondents of this study accept the use of drones by the municipality of Enschede, and whether transparency influences this.
In order to do that, all participants were randomly assigned to one of three locations: some of you were attending a festival in VR, others were in a park in VR and the rest was at a Business park in VR.
Further, half of the participants received the 'Municipality of Enschede Drone App', in which participants could look for information about who was responsible for the use of the drone, why drones were being used, how the data was collected and processed, privacy, they could look at pictures and a map and they could give feedback. The other half of the participants (control group) received a neutral message.

We hypothesized that disclosing honest information before a new technology (drone) was implemented and enhancing feelings of perceived control would lead to greater acceptance.