CLIENT PERCEPTIONS OF THE USE OF UNMANNED AIRCRAFT IN MIDDLE MILE TRANSPORTATION

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INTRODUCTION

Unmanned Aircraft have been in existence since their inception in 1907 (www.urbanismnext.org). Research has looked into passenger fear of flying extensively (Oakes & Bor, 2010a, 2010b; van Almen & van Gerwen, 2013; Wiederhold & Bouchard, 2014) On the other hand, research has also investigated the history and use of unmanned aircraft as test dummies, as incidental use in target training and as decoys in military use (Boulanin & Verbruggen, 2017). However, the combination of both fields of research with a focus on civilian use has never taken place. This research investigates the attitudes towards the perception of unmanned aircraft for middle mile transportation reflecting on the ongoing fast-paced development of this technology among civilians and its use in transporting personal goods.

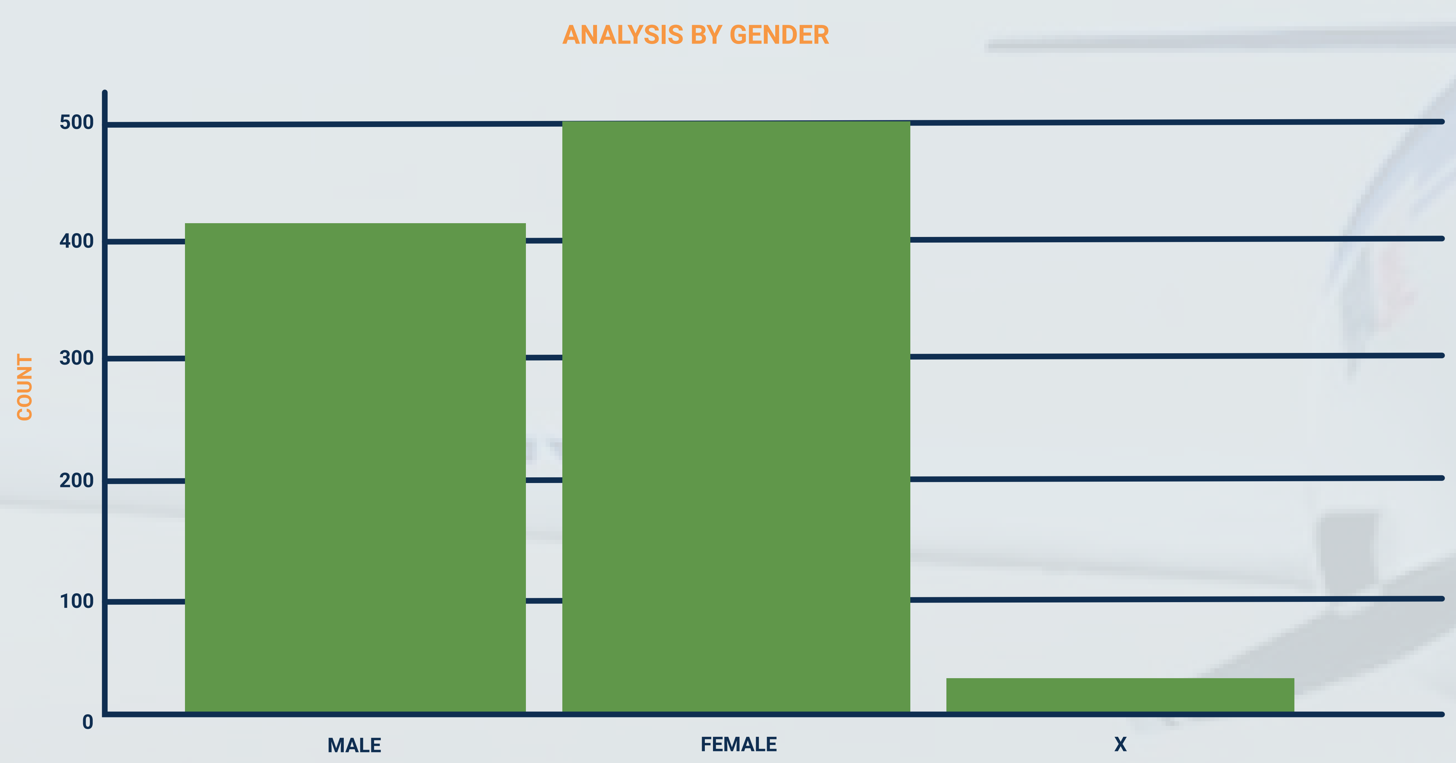
METHODOLOGY

Data were collected through the help of students reading for a study unit in Aviation Psychology at undergraduate level at the University of Malta. The study was registered with the Faculty Research Ethics Committee of the Faculty for Social Wellbeing. The survey was compiled of two separate questionnaires. The first questionnaire was a demographic questionnaire whilst the second one was a 17-item measure which was developed from the questionnaire developed by (Fleischer, 2012). The likert scale used was as follows: 1= "Absolutely Agree"; 2= "Strongly Agree"; 3= "Agree"; 4+ "Neither Agree nor Disagree"; 5= "Disagree"; 6= "Strongly Disagree"; 7= "Absolutely Disagree." Items 7, 8, 11 and 17 were reverse scored. The Cronbach's Alpha attained for this study was 0.838. In total, 896 responses were collected mainly online via google forms. Fifty (50) other questionnaires were collected via pen and paper method. Prior to answering the survey, participants were asked to watch a video about Unmanned Aerial Vehicles. Therefore, for the purpose of this research, a video issued by Dronamics freely available on You Tube was shown by means of the following link: https://www.youtube.com/watch?v=JddkES9S8jI

The main research question was the following:

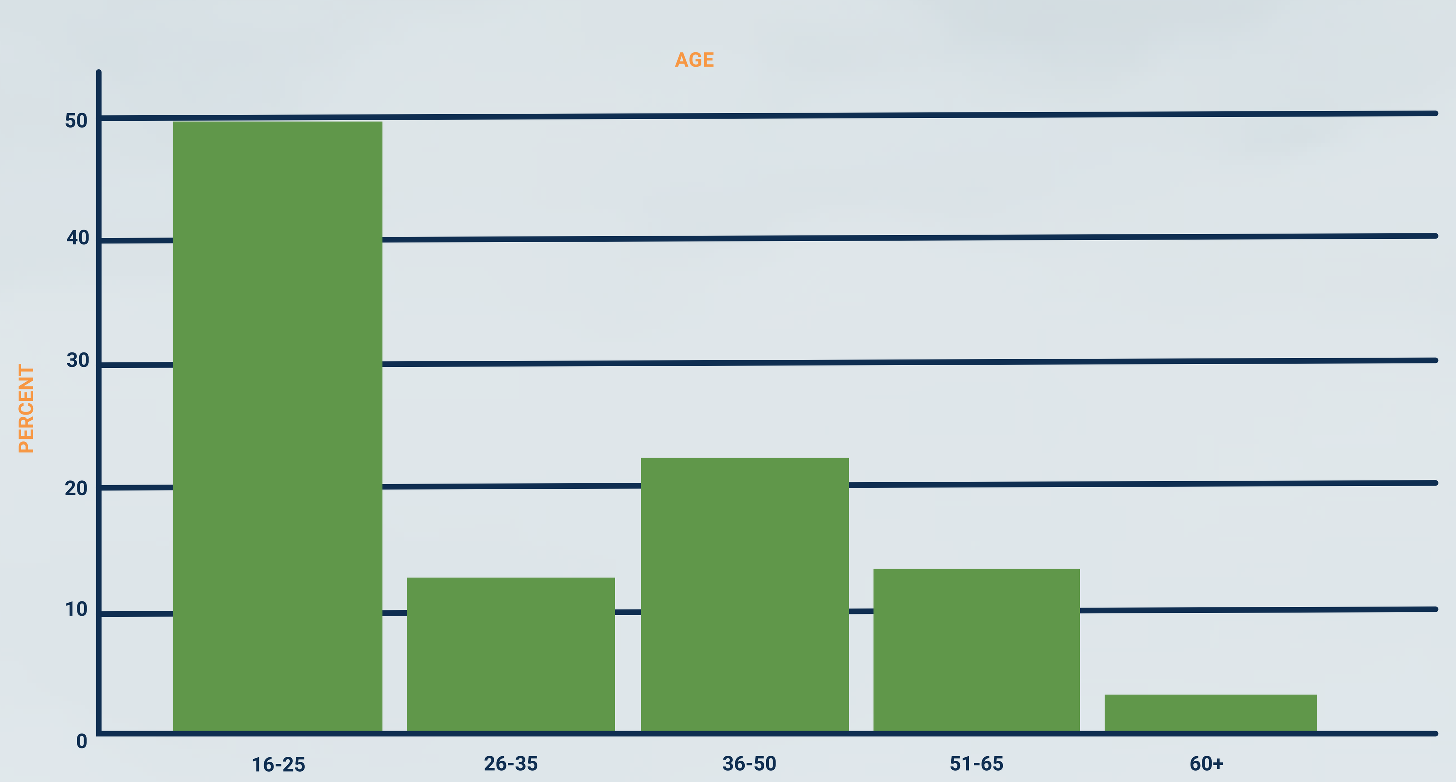
"What is the extent of fear of the use of Unmanned Aerial Vehicles?"
A research question rather than hypotheses was chosen because the field of research is new and the author felt it was unwise to establish any hypothesis at this stage.
Data collected were analysed by means of SPSS Version 28 for significant differences between group samples according to age, gender, location, number of children, number of elderly adults under care, profession and level of qualification.

RESULTS



Since those identifying themselves as X were very small, analysis was carried out only for differences between males and females. Significant differences were found for all the 17 items as follows:

"I am afraid of flying objects in general" P< 0.001: x Males = 5.86; x Females = 5.38
"I am afraid to know that there are unmanned aerial vehicles/drones which look like planes".
P< 0.001: x Males = 5.27; x Females = 4.81
"I feel insecure about unmanned aerial vehicles/drones which do not have onboard pilots".
P< 0.001: x Males = 4.94; x Females = 4.35
"I feel I am not in control when I see unmanned aerial vehicles/drones" P=0.009: x Males = 4.53; x Females =4.22
"I am uncomfortable when unmanned aerial vehicles/drones are present in any festive/outdoor activity" P=0.008: x Males = 4.93; x Females = 4.63
"The sound made by unmanned aerial vehicles/drones makes me feel uncomfortable" P=0.003: x Males = 5.12; x Females = 4.79
"I am happy to have my merchandise delivered by unmanned aerial vehicles/drones".
P=0.036: x Males = 3.19; x Females = 3.57
"I believe that whoever operates an unmanned aerial vehicle/drone should be properly qualified" P= 0.036: x Males = 1.84; x Females = 1.67
"I am afraid to be in places where unmanned aerial vehicles/drones are regularly used" P=0.004: x Males = 4.86; x Females = 4.55
"I get stressed when I realise that there is an unmanned aerial vehicle/drone operating in the vicinity" P< 0.001: x Males = 5.14; x Females = 4.73
"I feel that the use of unmanned aerial vehicles/drones should be highly regulated" P=0.005: x Males = 2.50; x Females = 2.23
"I feel that any form of flying is dangerous" P= 0.013: x Males = 5.40; x Females = 5.14
"I am uncomfortable when travelling on an aeroplane" P< 0.001: x Males = 5.66; x Females = 5.16
"I am uncomfortable during take off" P< 0.001: x Males = 5.39; x Females = 4.70
"I am uncomfortable during landing" P< 0.001: x Males = 5.24; x Females = 4.61
"I am uncomfortable when there is turbulence" P< 0.001: x Males = 4.10; x Females = 3.07
"I am happy to transport my goods using unmanned aerial vehicles/drones" P=0.003 x Males = 3.21; x Females = 3.56



Analysis of Variance according to 5 pre-established age groups, namely 16 to 25 years; 26 to 35 years; 36 to 50 years; 51 to 65 years and 66 years and over were carried out. There were no significant differences with regards to items 6, 7, 12, 13, 14 and 15 with regards to these age groups. The remainder of the items attained significance as follows:

For item 1 "I am afraid of flying objects in general", significant differences using Tukey HSD were reported between those aged 66+ (x =4.68) and those between 16 and 25 (x =5.67), between 26 and 35 (x =5.70) as well as those aged 36 and 50 (x =5.75). There were no differences between those aged 51 to 65 (x =5.21) and the other age groups.
For item 2 "I am afraid to know that there are unmanned aerial vehicles/drones which look like planes", significant differences using Tukey HSD were reported between those aged 66+ (x =4.03) and those between 16 and 25 (x =5.17), between 26 and 35 (x =5.24) as well as those aged 36 and 50 (x =5.02). There were no differences between those aged 51 to 65 (x =4.61) and the other age groups.
For item 3 "I feel insecure about unmanned aerial vehicles/drones which do not have onboard pilots", significant differences using Tukey HSD were reported between those aged 66+ (x =3.68) and those between 16 and 25 (x =4.77), between 26 and 35 (x =4.79) as well as those aged 36 and 50 (x =4.71). There were no differences between those aged 51 to 65 (x =4.17) and the other age groups.
For item 4 "I feel I am not in control when I see unmanned aerial vehicles/drones" significant differences using Tukey HSD were reported between those aged 66+ (x =3.61) and those between 16 and 25 (x =4.42), between 26 and 35 (x =4.66) as well as those aged 36 and 50 (x =4.44). There were no differences between those aged 51 to 65 (x =4.08) and the other age groups.
For item 5 "I am uncomfortable when unmanned aerial vehicles/drones are present in any festive, outdoor activity", significant differences using Tukey HSD were reported between those aged 66+ (x =4.68) and those between 16 and 25 (x =5.03), between 26 and 35 (x =5.00) as well as those aged 36 and 50 (x =4.64). Furthermore, significant differences were also found between those aged 51-65 (x =4.21) and those aged 26 to 35 (x =5.00) and those aged 16 to 25 (x =5.03). There were no differences between those aged 51 to 65 (x =4.21) and the those aged 36 to 50 (x =4.64).
For item 8 "I believe that whoever operates an unmanned aerial vehicle /drone should be properly qualified", there was one significant difference using Tukey HSD between those aged 66 and over (x =1.26) and those who are 16 to 25 years old (x =1.83).
For item 9 "I am afraid to be in places where unmanned aerial vehicles/drones are regularly used", significant differences using Tukey HSD were reported between those aged 66+ (x =3.65) and those between 16 and 25 (x =4.91), between 26 and 35 (x =4.96) as well as those aged between 36 and 50 (x =4.63). Furthermore, significant differences were also found between those aged 51-65 (x =4.12) and those aged 26 to 35 (x =4.96) and those aged 16 to 25 (x =4.91). There were no differences between those aged 51 to 65 (x =4.21) and the those aged 36 to 50 (x =4.64) as well as those aged 66 and over (x =3.65).
For item 10, "I get stressed when I realise that there is an unmanned aerial vehicle/drone operating in the vicinity", significant differences using Tukey HSD were reported between those aged 66+ (x =4.68) and those between 16 and 25 (x =5.12), between 26 and 35 (x =5.11), those aged between 51 and 65 (x =4.48) as well as those aged 36 and 50 (x =5.75).
For item 11, "I feel that the used of unmanned aerial vehicles/drones should be highly regulated" significant differences using Tukey HSD were reported between those aged 66+ (x =1.52) and those between 16 and 25 (x =2.74) as well as those aged between 26 and 35 (x =2.28). Furthermore, significant differences were also found between those aged 51-65 (x =1.65) and those aged 26 to 35 (x =2.28) and those aged 16 to 25 (x =2.74). Moreover, significant differences were found between those aged 36 to 50 (x =2.06) and those aged 26 to 35 (x =2.28) and those aged 16 to 25 (x =2.74).
For item 16, "I am uncomfortable when there is turbulence", significant differences using Tukey HSD were reported between those aged 66+ (x =2.32) and those between 16 and 25 (x =3.65), between 26 and 35 (x =3.81), those aged between 51 and 65 (x =3.27) as well as those aged 36 and 50 (x =3.43).

DISCUSSION

With regard to the main research question, frequency bar charts in general showed that potential clients are generally in favour of the use of unmanned aerial vehicles for transportation. The concept is indeed brand new and one which needs to be accustomed to. Although whoever answered the questionnaire was asked to watch a video, researchers cannot be sure that the respondents did in fact know what was being referred to in the questionnaire. To attest to this was question 8 where the respondents replied that whoever would operate an unmanned aerial vehicle would not need any proper qualification. Over 60% of the respondents absolutely disagreed that any formal qualification would be needed. Furthermore, almost 80% of the respondents feel that the use of unmanned aerial vehicles should not be highly regulated, indicating that the respondents still feel that drones or UAVs are small drones probably used for community purposes. This research also strongly indicates that more than half of the respondents indicate that they are not happy to transport their goods using UAV's which means that given the choice they would use other forms of transport or yet again have not figured out how these drones would operate. The items which were placed in the questionnaire relating to flying and aircraft in general were there to investigate the relationship between fear of flying and attitudes in relation to drones. For example, a significant positive relationship was attained between items 1 and the following items: 2 with an r=0.605; P<0.001; 3 with an r=0.539; P<0.001; 4 with an r=0.435; P<0.001 This means that those who are afraid of flying objects in general are also afraid to know that there are unmanned aerial vehicles which look like planes, feel insecure about unmanned aerial vehicles which do not have onboard pilots and feel that they are not in control when they see unmanned aerial vehicles. Analysis by gender indicated that there are significant differences across all aspects between males and females with the former being significantly less fearful and more willing to use drones for transportation than the latter in general. With regards to age groups, the smallest group of respondents were those aged 66+ and this could have had an impact on the results in general. It seems that this age group obtained a significant difference in the mean with regards to fear across 10 of the 17 items of the questionnaire indicating that this age group might be a little bit more resistant to the change proposed. Those aged 51 to 65 usually attained the score which followed the one attained by those aged 66+. This then indicated that those who are about to retire and who are however still at work and likely to be relatively settled in their life, to make less use of drones for transportation if given a choice. Overall, this area of study of course necessitates more research as the results attained are far from conclusive. Furthermore, for the purpose of this conference only a few of the available results were reported. It is highly recommended that this area of research is followed up given the keen interest of business entrepreneurs to venture in this area in order to transport their products. Qualitative research is strongly recommended in order to explore attitudes towards unmanned aerial vehicles for the use of transportation.

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