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Research Article

FACTORS AFFECTING POSITIVE WORD-OF-MOUTH COMMUNICATION INTENTION FOR DRONE-BASED DELIVERY SERVICE IN RETAILING

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Abstract

Drones, which have recently grown in popularity and provide endless potential in a variety of fields, are a useful commercial tool in addition to being a fun hobby. This study aimed to analyse the direct effects of perceived trust, perceived speed, and problem awareness on positive word-of-mouth communication intention for drone-based delivery services. In addition, the effect of drone-based delivery service on positive word-of-mouth communication intention and whether consumers' positive word-of-mouth communication intentions for drone-based delivery service differ significantly by gender and generation were also analysed. The online survey method was used to reach 433 people for the study. Many different statistical analyses were used to analyse the obtained data. As a result of the study, it was concluded that the positive effect of the drone-based delivery service on positive word-of-mouth communication intention was significant. It has also been concluded that perceived trust, perceived speed, and problem awareness have direct significant and positive effects on positive word of mouth communication intention for drone-based delivery services. However, no significant difference was found in consumers' positive word-of-mouth communication intentions by gender and generation. The results of the study were discussed, and suggestions were made.

Keywords: Drone-Based delivery, Perceived speed, Perceived trust, Problem awareness, WOM communication intention.

Jel Codes: M10, M30, L87.

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1. Introduction

Drone-based delivery is a revolutionary technological development that is fast replacing prior technologies, as well as a business model that is redefining daily work routines in the corporate sector (Kirschstein, 2021). Drone delivery has a number of benefits over traditional vehicle delivery, including lower emissions, lower operating costs, and faster delivery. Businesses are beginning to see the commercial potential of completely or partially autonomous flying vehicles. In other words, drones have attracted the attention of both investors and manufacturers as they work on a range of commercial applications (Floreano & Wood, 2015). The world market for drones will increase from approximately $4.2 billion to $10.3 billion in 2026 (Machi, 2017). One of the main reasons for this is the wide range of drone applications. Leading retail companies like Amazon and Alibaba are testing and implementing a variety of drone-based goods delivery systems (Kim, 2020).

The Worth of Mouth Communication (WOM) is defined as "*informal communications, directed at other consumers, about ownership, usage, or characteristics about particular goods and services and/or their producers/sellers*" (Matos & Rossi, 2008). This type of communication is one of the most powerful and effective strategies available to customers as it influences where customers shop, their purchasing preferences, their perceptions, expectations, awareness, attitudes, and judgments about a particular product or brand (Del Rio et al., 2001). Consumers may purchase or avoid purchasing a product or brand based on good or negative information and experiences about the product or brand in their environment. Positive WOM increases when customers are satisfied with a product or service. Dissatisfaction is related to negative word of mouth. In this case, the consumer may show a complaining attitude. Consumers who are dissatisfied because their expectations are not met may communicate their dissatisfaction or discontinue their association with the product (Odabaşı & Oyman, 2004). "*The role of WOM communication is considered to be particularly significant in a service context because the predominance of experience and credence qualities in services suggests that consumers experience a higher degree of perceived risk in making a purchase decision*" (Ennew et al., 2000).

Recent studies have drawn attention to investigating the factors affecting WOM communication intention for drone-based delivery services (Hwang & Kim, 2019; Hwang et al., 2020). Unlike previous studies, this present study explores the direct effects of perceived speed, perceived trust, and problem awareness on WOM communication intention for drone-

based delivery services based on the results of the studied literature review. Another difference between this study from previous studies is the effect of drone-based delivery services on WOM communication intention. In addition, this research looks into whether WOM communication intentions of consumers about drone-based delivery services change considerably by gender and generation.

2. Literature Review

2.1. Word-of-Mouth (WOM) Communication Intention

When predicting how people will use new technology, the interpersonal behavioural approach to technological acceptance may be more effective (Huang, 2017). In his study, Dichter (1966) expressed the sources of word of mouth as product loyalty, personal commitment, message loyalty, and commitment to others. He emphasized that consumers have a desire to talk about their experiences. WOM mostly occurs when consumers cannot provide the satisfaction they expect from the products or services (Anderson, 1998: 7). WOM is preferred by consumers for motivations such as reducing anxiety, taking revenge, seeking suggestions, and helping the company (Sundaram et al., 1998). The service provided by robot employees with human-like qualities positively affects consumers' WOM communication intentions (Lu et al., 2021). Consumers have WOM communication intentions for the use of autonomous robots supported by artificial intelligence technology in service delivery (Aydın, 2021). WOM communication is especially effective during the early stages of a marketing strategy product promotion (Kulviwat et al., 2007). The intention to spread WOM communication is positively affected by a consumer's good attitude after examining home delivery applications (Belanche et al., 2020). However, the effect of gender and age on WOM communication regarding service technology applications is insignificant (Divanoğlu, 2016; Kumar et al., 2021). The effect of service quality on WOM communication is not significantly different between males and females (Sun & Qu, 2011). Accordingly, hypotheses H_{1a}, H_{1b}, and H_{1c} were formulated.

H_{1a}: Drone-based delivery service will positively affect positive WOM communication intention.

H_{1b}: Consumers' positive WOM communication intentions will not differ significantly between genders.

H_{1c}: Consumers' positive WOM communication intentions will not differ significantly between generations.

2. 2. Perceived Speed

High speed is one of the leading potential advantages of drone-based delivery, in addition to cost savings and high flexibility (Kirschstein, 2021). Drones are unaffected by road infrastructure or traffic bottlenecks. Thus, they can fly above them. Thanks to the use of drone autonomous vehicles, it is possible to deliver packages on the most appropriate route and at the right time, from the starting point where the packages are received to the destination where the packages will be delivered. In this direction, drone autonomous vehicles have the flexibility required to provide extremely fast delivery services where and when customers want (Joerss et al., 2016; Lee et al., 2016). Drone-based delivery should match customers' expectations in terms of speed, as the relative advantage of speed is an important factor for consumers to adopt drone-based delivery services (Yoo et al., 2018). Because the dimension of service speed is critical for favourable customer word of mouth (Said et al., 2018). Consumers, on the other hand, make good or negative service evaluations online based on the perceived speed with which smart technologies provide service (Yazıcı Ayyıldız & Eroğlu, 2021). Based on this, the H_2 hypothesis was formulated.

H_2: Perceived speed will positively affect positive WOM communication intention.

2. 3. Perceived Trust

Mayer et al. (1995) define "*trust as a behaviour based on one's beliefs about another person's attributes*". Because the degree of uncertainty in a transaction in a virtual environment is higher than in a traditional one, perceived trust becomes an important component (Roca et al., 2009). Perceived trust has been found to be an important driver of consumer perceptions and willingness to adopt other technologies. Additionally, perceived trust is an important factor influencing consumers' intentions to accept drone-based delivery services (Leon et al., 2021). "*Perceived trust is the most important factor in promoting a positive attitude toward autonomous vehicles and the intention to use them*" (Zhang et al., 2019). As a result, consumers' expectations in terms of safety should be met by drone-based delivery (Yoo et al., 2018). Consumers' desire to refer to online businesses is favourably influenced by their confidence in them, demonstrating that perceived trust is a significant factor in antecedent customer good WOM (Chu & Kim, 2011; Matos & Rossi, 2008; Wu et al., 2018). In addition, security (Belanche et al., 2020) and perceived trust (Jalilvand et al., 2017; Sampat & Sabat, 2021) factors affect consumers' WOM communication intentions. Accordingly, the H_3 hypothesis was formulated.

H_3: Perceived trust will positively affect positive WOM communication intention.

2. 4. Problem Awareness

Drone deliveries powered by electrically rechargeable batteries play an essential part in environmental protection (Hwang & Kim, 2019). On the other hand, it is generally known to consumers that traditional delivery methods with gasoline motorcycles or cars cause air pollution. As a result of customers' attitudes toward the electric and environmentally friendly drone-based delivery technique, there are plans to use this present delivery method (Hwang & Kim, 2019; Kim & Hwang, 2020) as well as WOM communication intentions (Hwang & Kim, 2019). Therefore, drone-based delivery must meet customers' expectations in terms of environmental friendliness (Yoo et al., 2018).

In the recent decade, a small number of studies have been undertaken to investigate the influence of eco-friendly initiatives on consumer WOM communication intention (Gao et al., 2016; Han et al., 2020; Hwang et al., 2020). There is a positive relationship between consumers' environmental knowledge/awareness and WOM communication intentions (Gao et al., 2016). Corporate social responsibility in the environment has a significant positive role in providing word of mouth for airline services (Han et al., 2020). As a result, the responsibility to take environmental steps has a favourable effect on WOM communication intention for drone-based delivery services (Hwang et al., 2020). The H_4 hypothesis was developed from this perspective.

H_4: Problem awareness will positively affect positive WOM communication intention.

3. Method

3. 1. Measurements and Survey Development

Perceived trust (Cha, 2020), perceived speed (Yoo et al., 2018), and problem awareness (Kim & Hwang, 2020) scales, whose validity and reliability have been proven by previous studies, were adapted to this study. To determine whether the scale items adapted from English to Turkish for this study were understood, feedback was received from marketing academics who are experts in their fields. Thus, the scale items were translated by translation-re-translation. However, before participating in the survey, the video link for the drone-based delivery service was shared with the people reached within the target audience. Thus, a reasonable level of data validity was obtained (Jin et al., 2019), since the participants would be affected by the video before participating in the survey (Chiasson et al., 2009).

3. 2. Target Population, Sampling and Data Collection

The target population of this present study is citizens residing in Turkey. Individuals of the Z, Y, X, or Baby Boomers generation are included in the target population. To determine the age ranges of the participants (in which year they were born), a question was directed to them through the survey. However, ethical committee approval is required to collect data from the target population through a survey. An application was made to the Van Yüzüncü Yıl University Social and Human Sciences Publications Ethics Committee to obtain ethics committee approval. Ethics committee approval document dated 07/01/2022 and numbered 2022/02-05 was received. Data were collected from a certain number of people from the target population with the convenience sampling method. Because considering the size of the target population of this current study, it is possible to collect data in the fastest, easiest, and most economical way thanks to convenience sampling (Aaker et al., 2007: 394). The self-directed survey link (the video link was shared in the online survey) was shared with people who were reached via social media accounts and who wanted to participate in the survey. The sample size is at least fifteen subjects per independent variable (Stevens, 1996: 72), at least ten times the total scale items (Hair et al., 2009: 329), over two hundred (WilsonVon Voorhis & Morgan, 2007), and a ninety-five percent confidence level (Krejcie & Morgan, 1970).

3. 3. Data Analysis

Many different statistical analyses were used to analyse the obtained data. Frequency analysis was used to determine the demographic profiles of the participants. While factor analysis was used to determine the construct validity of the scales, reliability analysis was used to determine the reliability of the scales. One-sample t-test, independent-group t-test and ANOVA were used to test the differences in consumers' WOM communication intentions according to control variables. Finally, using regression analysis, the effect of an independent variable on the dependent variable was analysed.

3. 4. Research Model

The research model developed on perceived speed, perceived trust, problem awareness (independent variables), drone-based delivery service, gender, generations (control variables), and positive WOM communication intention (dependent variable) is shown in Figure 1.

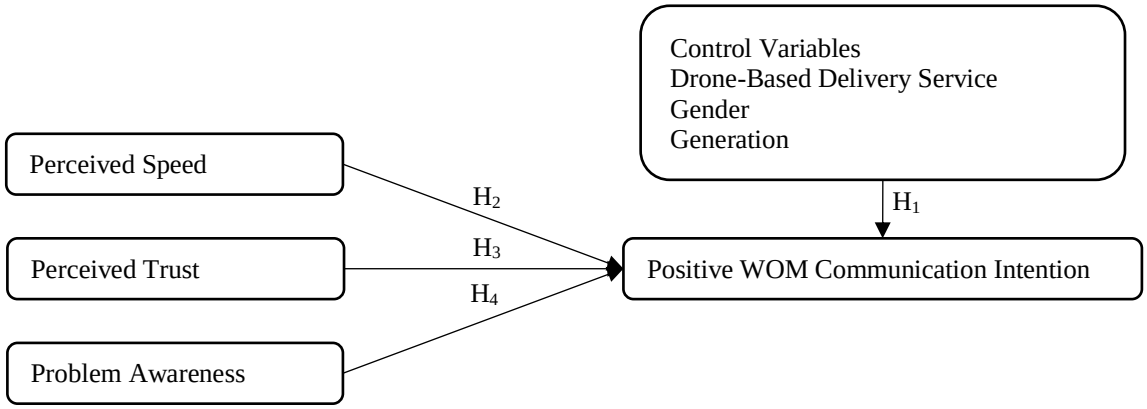

Figure 1.
Research Model

4. Results

4. 1. Respondents' Profile

The profile of the participants is shown in Table 1. There are 433 participants in total. The number of male participants (n=305; 70.4%), Y generation participants between the ages of 27-41 (n=246; 56.8%), university graduate participants (n=331; 76.4%), and participants whose monthly income varies between 5001-7500 TL (n=124; 28.6%) are higher.

Table 1.
Demographic information for respondents

Items		**f**	**%**	**Items**		**f**	**%**
Gender	Female	128	29.6	Level of Education	Primary school	10	2.3
	Male	305	70.4		Secondary school	13	3.0
Total		**433**	**100.0**		High school	79	18.2
Age	10-26 (1996–2012; Z Generation)	88	20.3		University	331	76.4
	27-41 (1981-1995; Y Generation)	246	56.8	**Total**		**433**	**100.0**
	42-57 (1965-1980; X Generation)	87	20.1	Monthly Income	0-2500 TL	108	24.9
					2501-5000 TL	107	24.7
	58-76 (1946-1964; Baby Boomer generation)	12	2.8		5001-7500 TL	124	28.6
					>7500 TL	94	21.7
Total		**433**	**100.0**	**Total**		**433**	**100.0**

4. 2. Validity and Reliability

While factor analysis was applied to determine the validity of the data obtained, reliability analysis was also applied to determine the reliability of the factor dimensions. Factor and reliability analysis results are shown in Table 2. It is seen that the KMO value is >0.80, the p value is <0.05 (Kaiser, 1974), the factor items loadings are >0.50 (Hair et al., 2009), the total variance explained is >85% (Gorsuch, 1983: 165), and the reliability value of each of the factor dimensions are >0.80 (Kayış, 2005). In addition, AVE and CR values were calculated to reveal whether convergent validity, which expresses the relationship of the items in the factor dimensions with each other and with the factor dimension they form, is supported (Yaşlıoğlu, 2017). Convergent validity is supported because AVE values are less than .50, CR values are greater than .70, and CR values are greater than AVE values (Fornell & Larcker, 1981).

Table 2.
Results for factor and reliability analysis

Factor	**Items**	**Loading**	**Variance %**	**Reliability**	**AVE**	**CR**
Positive WOM Communication Intention	I can recommend drone-based delivery services to others.	.938	55.248	.950	.865	.950
	I can say positive things about drone-based delivery services to others.	.928				
	I can encourage others to use drone-based delivery services.	.924				
Perceived Speed	Drone-based delivery allows to receive a package quickly.	.951	18.369	.936	.858	.948
	Drone-based delivery is a speedy way to get a package delivered.	.927				
	Drone-based delivery is useful for getting a package fast.	.900				
Problem Awareness	Current delivery vehicles such as motorcycles and cars can potentially have a negative impact on global warming.	.955	8.633	.934	.883	.958
	Current delivery vehicles such as motorcycles and cars can lead environmental pollution.	.938				
	Current delivery vehicles such as motorcycles and cars can cause air pollution.	.926				
Perceived Trust	Thanks to drone-based delivery, it seems possible to deliver the package to the right address and at the desired speed.	.932	6.248	.912	.791	.919
	Drone-based delivery looks trustworthy.	.900				
	Drone-based delivery will have a reliable performance.	.834				

Total Variance Explained%		88.497	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.883	
Bartlett's Test of Sphericity	Approx. Chi-Square=5203.125	df=66	Sig.=.000

4. 3. Normality Test

The normality test results for the obtained data are shown in Table 3. If both the skewness and kurtosis coefficient values are between -3 and +3, it should be accepted that the data set has a normal distribution (Kalaycı, 2010). In addition, there are studies indicating that the data set is considered to have a normal distribution if the skewness coefficient values are between ±3 and the kurtosis coefficient values are between ±10 (Kline, 2005). Accordingly, it should be accepted that the data obtained for this current study show a normal distribution.

Table 3.
Normality test results

Variables	Positive WOM Communication Intention	Perceived Speed	Problem Awareness	Perceived Trust
Skewness	-.811	-1.619	-1.366	-.571
Kurtosis	-.311	2.141	1.202	-.418

4. 4. Correlation Analysis, Common Method Variance and Multicollinearity

Since the data obtained had a normal distribution, Pearson correlation analysis was performed, and the results are shown in Table 4. It is seen that the relationship between both variables is significant and positive. On the other hand, a common method variance bias can be checked with the correlation matrix procedure (Rodríguez-Ardura & Meseguer-Artola, 2020). As can be seen, since the correlation coefficient (r) between both variables is less than .90, it should be accepted that there is no common method variance bias for the data obtained (Bagozzi et al., 1991: 437; Pavlou et al., 2007). Finally, it is worth noting that there is no multicollinearity problem for the data obtained because the correlation coefficient between both variables is less than .80 (Büyüköztürk, 2014: 100).

Table 4.
Pearson correlation analysis results

Variables		Positive WOM Communication Intention	Perceived Speed	Problem Awareness	Perceived Trust
Positive WOM Communication Intention	r	1	.634**	.289**	.718**
	p		.000	.000	.000
Perceived Speed	r	.634**	1	.313**	.644*
	p	.000		.000	.000
Problem Awareness	r	.289**	.313**	1	.278**
	p	.000	.000		.000
Perceived Trust	r	.718**	.644**	.278**	1
	p	.000	.000	.000	

4. 5. Hypothesis Testing

The results of the difference tests for the H_{1a}, H_{1b}, and H_{1c} are shown in Table 5. The effect of drone-based delivery service on positive WOM communication intention is significant (t_{432}=13.728; p.=.000). In contrast, there is no significant difference in positive WOM communication intentions of consumers according to gender (t_{431}=-.186; p=.653) and generations ($F_{(3,429)}$= 1.684; p=.170).

Table 5.
Results of Difference Tests

The results of t-test for one sample (drone-based delivery service)						**Test Value=3**			
Independent Variable	**Dependent Variable**	**H**	**n**	**x̄**	**SD**	**df**	**t**	**p**	**Result**
Drone-based delivery service	Positive WOM Comn Intention	H_{1a}	433	3.8006	1.21357	432	13.728	.000	Supported
The results of t-test for independent (gender) groups									
Group	**H**	**n**		**x̄**	**SD**	**df**	**t**	**p**	**Result**
Female	H_{1b}	128		3.7839	1.18062	431	-.186	.653	Supported
Male		305		3.8077	1.22898				
ANOVA results for independent (age) groups									
Source of Variance	**H**	**Sum of Squares**		**df**	**Mean Squares**		**F**	**p**	**Result**
Between Groups	H_{1c}	7.404		3	2.468		1.684	.170	Supported
Within Groups		628.827		429	1.466				
Total		**636.231**		**432**	**3.534**				

Regression analysis results for H_2, H_3, and H_4 are shown in Table 6. Positive WOM communication intention for drone-based product delivery service is positively affected by perceived speed (β=.634; p=.000), perceived trust (β=.718; p=.000), and problem awareness (β=.289; p=.000).

Table 6.
Results of Regression Analysis

Independent Variable	Dependent Variable	R^2	F	t	β	Tolerance	VIF	p	Results
Perceived Speed	Positive WOM Communication Intention	.401	288.935	16.998	.634	1.000	1.000	.000	Supported
Perceived Trust	Positive WOM Communication Intention	.516	459.412	21.434	.718	1.000	1.000	.000	Supported
Problem Awareness	Positive WOM Communication Intention	.084	39.296	6.269	.289	1.000	1.000	.000	Supported

5. Conclusion and Discussion

This current study aimed to investigate the factors that influence positive WOM communication intention for drone-based delivery services in retailing.

As a result of this current study, it was seen that drone-based services positively affect consumers' positive WOM communication intentions. It has also been supported by previous studies that autonomous robots used in service delivery have an effect on consumers' WOM communication intentions (Lu et al., 2021).

The findings on the impact of service speed on customer WOM communication intentions are similarly consistent with previous research (Said et al., 2018; Yazıcı Ayyıldız & Eroğlu, 2021). Drone-based services, which allow consumers to deliver where and when they want, faster than traditional ways, may help retail companies not only by increasing customer satisfaction but also by serving as an important communication tool.

Consumers' positive WOM communication behaviour is affected by their increased trust in drone-based services. Similar results were obtained in the studies conducted by Jalilvand et al. (2017), and Sampat and Sabat (2021). Consumers who have trust in a company's products and services are more willing to tell their friends about it (Wu et al., 2018). The consumers' strong awareness of the brand will also increase trust. To establish a sense of trust, retailers must focus on establishing a well-known and reputable brand. Furthermore, measures such as the reliability of the drone delivery service, the security of personal data, and accountability are expected to help the development of trust.

Customers' problem awareness in drone-based delivery services affects their positive WOM communication behaviours. These findings are also supported by studies by Gao et al., (2016) and Han et al., (2020). In this regard, it should be emphasized in communication efforts

that drone-based services would create fewer environmental problems than traditional delivery methods for environmentally aware customers.

Gender and generational differences in customers' positive WOM communication intentions were not found to be significant. According to the results of previous studies, the effect of gender and age is insignificant in WOM communication regarding service technology applications (Divanoğlu, 2016; Kumar et al., 2021). At the same time, there is no significant difference in the effect of service quality on WOM communication between males and females (Sun & Qu, 2011).

6. Implications for Theory

Primarily, this research contributes to the flow of drone delivery adoption research. The effects of perceived speed, perceived trust, and problem awareness on positive word of mouth were analysed in this study. Consumers have a positive attitude toward drone-based delivery because of its perceived speed, which they share with those around them. Increased trust in drone-based services influences consumers' positive WOM communication behaviour. Customers' awareness of the problem with drone-based delivery services has an impact on their good WOM communication activities.

7. Implications for Practice

Depending on the results of the study, it is possible to state the following: Retail businesses should give importance to drone-based delivery services design. Customers will become more aware of this service if they have a pleasant and exciting experience with it from the beginning. Furthermore, attractive advertising campaigns on the benefits of drone-based delivery services should be developed to increase customer usage and WOM communication intentions. Drone-based delivery should be done more quickly than traditional delivery methods. The primary purpose of service-provider businesses should be to establish trust-based relationships with their customers. Drone-based services can be faster and more environmentally friendly applications that lessen security problems. Therefore, communication efforts are especially important. Finally, advertisements for drone delivery services via existing media channels such as social media could be an alternative to increase retail businesses' exposure to drone service.

8. Limitations and Future Research

It should be emphasized that this study has limitations. First of all, since the data for this study were collected in Turkey, it may be difficult to extend the findings to other nations. Another limitation of the study is that the convenience sampling method was used in the study. A new study can be performed to examine whether the study's findings can be extended to other regions. Because this study focuses on drone-based delivery services in retail, the findings may not extend to other industries. Another study can look into the effects of perceived benefit, perceived risk, and attitude factors on drone-based delivery services WOM communication. Artificial intelligence and fuzzy logic qualitative comparison analysis (fsQCA) tools could be utilized in future studies to investigate people's perceptions of drone delivery.

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Ethical Approval: All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed Consent: Informed consent (online) was obtained from each respondent.

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