

Impact of Perceived Risks on Consumer's Use Intention of Drone Food Delivery: A new Service Concept Testing

Amal Obaikah A.Alshammari

*College of Business, Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, KSA
PhD Student at King Saud University, College of Business Administration, Riyadh, Saudi Arabia.*

Mahmoud Abdelhamid Saleh

King Saud University, College of Business Administration, Department of Marketing, Riyadh, Saudi Arabia.

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Abstract: Purpose – This paper aims to investigate the impact of perceived risks on overall image of drone food delivery (DFD) service as a new concept testing in Saudi Arabia. Furthermore, this study examines how the image of drone food delivery services influences consumers' intentions to use these services.

Design/methodology/approach – This study employs Perceived Risk Theory as its theoretical framework. Data were collected from 321 respondents in the Kingdom of Saudi Arabia (KSA) and analyzed using Structural Equation Modeling to examine the hypothesized relationships among variables.

Findings – The study found that performance, delivery, privacy, and psychological risks are negatively influencing the overall image of drone food delivery services. Conversely, financial risks were found to have insignificant impact. The study also found that a favorable overall image of drone food delivery services significantly impacts consumers' intention to use the service.

Originality/value – This study introduces a novel examination of drone food delivery as a new service concept in Saudi Arabia. It provides valuable insight for food delivery companies in Saudi Arabia by exploring factors that influence consumer intention to use DFD, thereby aiding in service improvement and strategic decision-making.

Keywords: Image, Perceived risk, Drone food delivery services, Intentions to use.

Paper type- Research paper.

1. Introduction

The technological revolution is not confined to a single industry. In fact, many inventions initially designed for a particular sector have, either by chance or through targeted research, found applications in other industries. One such invention is the drone, which was originally intended for military purposes, then used in the media and photography, and is now being used in the food delivery sector in some countries.

Today, the Saudi market is experiencing a rising trend in ordering food online through mobile applications. For instance, the Chefz food delivery app features over 12429 Restaurants as of 2025 in Saudi Arabia (The Chefz, 2025). This increasing number of restaurants joining the platform indicates a growing consumer acceptance and adoption of food ordering via existing digital applications in Saudi Arabia.

This growing trend presents major challenges to the restaurant sector because traffic is increasingly congested in many Saudi cities. Consequently, this congestion can obstruct food delivery for customers on time, potentially affecting how customers are satisfied and operations are efficient. Since customary vehicles maintain within them the rising demand for last-mile delivery, they will likely exacerbate the safety risks, increase more the air pollution,

worsen a lot of traffic congestion, and lead to some various social and environmental challenges (Ignat and Chankov, 2020). Steady demand constantly affects the food industry. This occurs within the consumer sector. Initially restaurants offered delivery services within a limited area restricting their ability toward attracting a wider customer base. Delivery apps have allowed them to broaden their reach and serve a larger clientele. Many of the restaurants located in Saudi Arabia think that mobile commerce applications can attract some new consumers. In the current era, the food industry sees fierce competition (Abed, 2023).

Nonetheless, traffic congestion and peak times constitute significant challenges for the delivery sector. During these periods, consumers may cancel orders or receive them late or in poor condition. Many food delivery applications have attempted to address this issue by offering pre-scheduling services to ensure timely deliveries when possible. However, with population growth and an increase in the workforce, the main challenge for restaurants remains the prompt delivery of orders.

In Saudi Arabia, drones are not yet available in the food delivery sector. In this context, will the acceptance of food delivery services via apps, which involve the use of cars or trucks, be similar to the acceptance of food delivery services via drones? Many countries, such as the UK and New Zealand have successfully experimented with drones, although there were initially some consumer skeptics about the service (Bamburly, 2015; Morgan, 2017; Reid, 2016). In Dubai, Costa Coffee, located on Jumeirah Beach Road, faced difficulties in serving certain beverages, such as iced coffee, on the sandy beach. However, after using drones, serving became much more convenient (Lifestyle Watch, 2017). Perceived risk is inversely related to the adoption of new technology, making it crucial to examine the risks consumers associate with such technologies (Hwang & Choe, 2019). Accordingly, this study will focus solely on perceived risks as a preliminary step to understanding the Saudi consumer's intention regarding drone food delivery as a concept testing study.

2. Literature review

2.1 Drone food delivery services

Interest in drone food delivery services has grown as a potential solution for faster, more cost-effective, and environmentally friendly delivery (Hwang et al., 2020; Patel, 2022). Research has focused on developing autonomous navigation systems for drones, including obstacle avoidance and precision landing techniques (Patel, 2022). A drone is defined as a small, unmanned aircraft capable of autonomous flight, supported by onboard computers and sensors (Snead and Siebler, 2017). Drones were used for military purposes during World War I and subsequently expanded to include various sectors (Muchiri et al., 2016). Notably, the concept of drone delivery gained significant prominence in 2016 when Domino's Pizza successfully delivered pizza via drone to a customer's home in New Zealand (Reid, 2016)

Additionally, drones reduce greenhouse gases and carbon dioxide emissions, making them an environmentally friendly delivery option (Park et al., 2018). Regarding cost, a cost analysis by Raghunatha et al. (2023) and Doole et al. (2018) found that using drones for food delivery was roughly less than half the cost compared with the other vehicles. In addition to these benefits, research by Jaramillo et al. (2019) identified time and energy efficiency as critical success factors for drone delivery services. Furthermore, during the COVID-19 pandemic, drone delivery services have emerged as an effective solution to lockdowns, facilitating food delivery to self-isolating individuals (The Times, 2023). This has led to a surge in drones' popularity as a valuable tool in the food delivery sector (Hwang et al., 2023).

Many industries use drones for logistics and delivery tasks (Campbell et al., 2017), significantly improving existing infrastructure and increasing efficiency (Chiang et al., 2019). Drones have limited payload weight and limited battery capacity and can navigate at a constant speed (high speed) regardless of traffic congestion (Ko et al., 2024).

2.2 Perceived risk theory

Consumer's perceived risk was originally theorized by Bauer (1960) as the undesirable outcome that a consumer anticipates that it can follow his current actions (Bauer, 1960). Perceived risk theory states that risk is a multidimensional concept, containing components, each with attached influence on consumers' overall perceived

risk, which vary across persons (Mitchell, 1999). Some consumers may be skeptical of new technology products and services due to a lack of trust or clarity (Mathew et al., 2021). Taylor (1974) mentioned risk as “being the possible loss in a choice condition (Taylor, 1974, p. 54). Perceived risk in using drone food delivery services is defined as the subjectively determined expectation of loss by a drone food delivery service (Hwang & Choe, 2019). Moreover, Public understanding, facilitated by industry communication and media, is probably shaping risk perceptions tied to drone food deliveries (Mathew et al., 2021).

This research examines five specific risks performance risks: financial risks, delivery risks, privacy risks, and psychological risks related to drone food delivery services. First, the term "performance risk" refers to the possibility that a product will malfunction or fail to perform as intended, thus failing to deliver the expected benefits (Horton, 1976; Kushwaha and Shankar, 2013). Forsyth & Shi (2003) argue that purchasing products online, where consumers cannot physically touch or examine them, tends to raise levels of performance risk. Likewise, consumers considering using drone food delivery (DFD) services are likely to perceive performance risks, given their lack of ability to accurately evaluate service performance before using them (Hwang & Choe, 2019).

Second, Financial risk is defined as the potential loss of money resulting from an unsound purchasing decision (Forsyth and Shi, 2003; Kushwaha and Shankar, 2013). When consumers believe there is a possibility that they will not get enough value for their expenditures, they tend to perceive higher levels of financial risk (Kim et al., 2005). This financial risk is especially prevalent when consumers encounter new technologies for the first time (Anja, 2016), making them more concerned about the potential financial losses associated with DFD services (Hwang & Choe, 2019).

Third, the delivery risk is related to accident, theft, or damage of the drone transporting the food (Mathew et al., 2021). Fourth, the use of civilian drones for commercial tasks such as food delivery poses numerous privacy and security threats. Drones can be misused for cyber espionage, surveillance, and violation of personal privacy, a term known as "privacy risks" (Ramadan et al., 2017). These fears regarding drone usage for civilian applications might inhibit consumers from embracing them for food delivery (Lidynia et al., 2017). Another study examined how privacy and safety risk factors affect consumers' willingness to accept drone food delivery services (Ramadan et al., 2017). Additionally, the individuals in Australia showed a neutral response to risk, implying that the general public has not yet formed an ultimate stance on using drones for food deliveries (Clothier et al., 2015). Regulatory laws designed to protect personal privacy could potentially decrease these risks and stimulate acceptance of this technology (Zwickle et al., 2019).

Lastly, psychological risk is defined as the risk that the service purchased will have a negative effect on the consumer's peace of mind or self-perception (Garner, 1986). Also, psychological risk can manifest as a potential loss of self-image (Kim et al., 2008). When consumers consider the acceptance of drone food delivery technology, they may experience negative emotions such as frustration or anxiety or nervousness due to apprehensions relevant to this new unfamiliar delivery service (Hwang & Choe, 2019).

Depending on the previous studies, as consumers are more likely to avoid or decrease negative outcomes rather than maximize benefits by taking some risks, it is very critical to study perceived risk to understand their behavior (Im et al., 2008). Hwang & Choe (2019) showed that when consumer concerns are associated with novel technologies, consumers' perceived risk tends to be enhanced.

2.3 Overall Image of DFD

The image refers to the perception of a product that consumers usually have (Parameswaran et al., 1994). Various studies have consistently studied the concept of the overall image in airlines, hotels, restaurants, and tourism (Hwang et al., 2018; Park et al., 2017; Ryu et al., 2008). The overall image can be defined as one of the consumers' characteristics regarding a product/service (Kotler, 2001). Likewise, a study sees that the overall image refers to the overall recognition of a specific product/service formed based on information received from different sources of the product/service (Assael, 1984). The overall image of a product/service is considered an essential factor that influences the customers' decision-making processes (Han et al., 2009). Moreover, the overall image is certainly connected to corporate profits, so many companies are making endeavors to create a positive overall image

(Famiyeh, 2017; Zameer et al., 2015).

In the context of the relationship between risk perception and overall image, several studies have addressed this aspect. For example, consumers are concerned about unpredictable outcomes when they use new technological services (Martins et al., 2014). When consumers perceive high levels of risk from the new technology-based services, they would have an unfavorable image of the services (Aghekyan-Simonian et al., 2012). Also, the public perception of technology is negative when individuals perceive a high level of risk in using a new technology (Curran, 2005). Moreover, it harmed the overall image when consumers think drone food delivery performs poorly, and when they feel anxiety, nervous, or don't fit someone's self-image (Hwang & Choe, 2019). Depending on the theoretical background and previous studies, we put forward the following hypotheses:

H1a: Perceived Financial risk of drone food delivery service has a statistically significant negative impact on the overall image of service.

H1b: Perceived Delivery risk of drone food delivery service has a statistically significant negative impact on the overall image of service.

H1c: Perceived psychological risk of drone food delivery service has a statistically significant negative impact on overall image of service.

H1d: Perceived Performance risk of drone food delivery service has a statistically significant negative impact on the overall image of service.

H1e: Perceived Privacy risk of drone food delivery service has a statistically significant negative impact on the overall image of service.

2.4 Intention to use DFD

The definition of intention to use is the degree to which an individual has developed conscious plans to perform from critical future behavior (Warshaw et al., 1985, p. 214). These intentions are determined by a customer's favorable evaluation of a product or service (Joo et al., 2022). Various studies have shown that the image that customers creates toward a particular product can increase and stimulate their intentions to use the product (Lee et al., 2010). In terms of intention to use a new technology, the overall attitudes play a critical role in the formation of behavioral intentions (Kaushik et al., 2015).

Additionally, it is broadly accepted that the image of a specific product has an essential impact on the process of purchasing the product, so if customers have a positive image of a product, they are more likely to have a high level of behavioral intentions (Papadimitriou et al., 2015). Moreover, Previous research has also emphasized the impact of image on behavioral intentions. For example, a study showed that image is a critical antecedent of behavioral intentions (Prayag et al., 2017). Also, a previous study tried to determine the relationship between image and behavioral intentions in the airline industry, they found that when passengers have a good image of an airline, they tend to use the airline in the future (Han et al., 2014). Han et al. (2019) investigated how to form the overall image and its impact on outcome variables in the hotel industry, they found that the overall image helps to enhance behavioral intentions.

In the context of drone food delivery, Consumers are more likely to engage with drone food delivery services when they perceive them as capable and useful of developing their performance in various tasks (Jasim et al., 2022). Also, Hwang & Choe (2019) showed that the overall image of drone food delivery has a positive impact on intention to use. Based on the previous research, the following hypothesis is developed:

H2: The overall image of drone food delivery service has a statistically significant positive impact on intention to use.

2.5 Conceptual model:

Based on the above literatures, a theoretical model was developed for this research which is presented in figure 1.

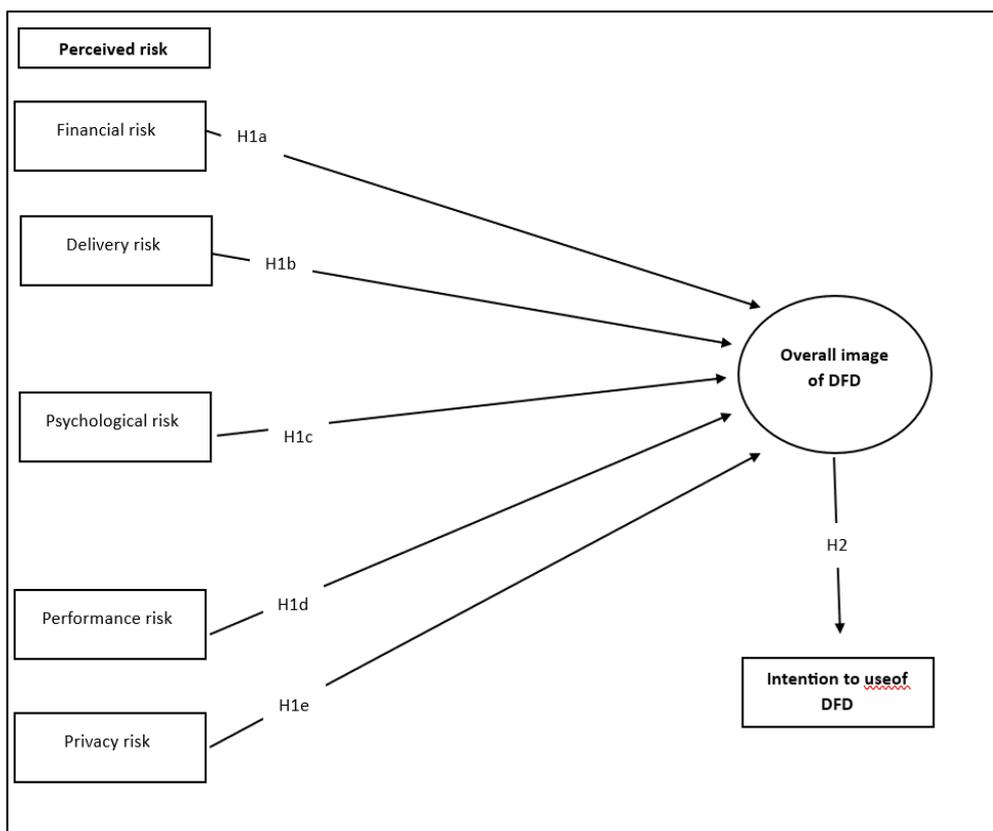


Figure 1.

3. Research methodology

3.1 Sampling & data collection methods

The definition of concept test is the process of using quantitative and qualitative methods to evaluate consumer response to a product idea before it is introduced to the market (Thomas, 2022). In this research, since the drone food delivery service is not currently available in Saudi Arabia, a questionnaire will be used to collect information to determine consumers’ impressions of this service and their intention to use it when it is available. The research has employed a quantitative methodology, utilizing online surveys by Google Forms for data gathering. The forms were sent to participants in two ways, via email and social media such as WhatsApp. The sample is from IMAM university students in Saudi Arabia. 341 responses were received, and outliers were excluded, leaving a final total of only 321 responses. The sample characteristics are shown in Table (1). The sample predominantly consists of young individuals under the age of 25, accounting for 86.6%. Most participants place food orders between 2 to 5 times per month, representing 77.6% of the sample. Males make up the majority of respondents with a percentage of 60.7%. Additionally, the majority of respondents are undergraduates, comprising 81.3% of the sample.

Table (1) Sample Characteristics

Category	Subcategory	N	%
Age	Under 25	278	86.6%
	Under 35	21	6.5%
	Under 45	21	6.5%

	Above 55	1	0.3%
Education Level	Secondary	36	11.2%
	Undergraduate	261	81.3%
	Graduate	24	7.5%
Orders	Once a month	72	22.4%
	2–5 times a month	249	77.6%
Gender	Male	195	60.7%
	Female	126	39.3%

3.2 Measurement Scales

This study used the measurement items that have been proven to be reliable and valid in previous studies. Perceived risk was measured with 19 items used by Chen (2013), Martins et al. (2014), Pascual–Miguel et al. (2015), Lopez-Nicolas and Molina-Castillo (2008), and Soffronoff et al. (2016). The overall image was measured with 3 items used by Han et al. (2009) and Jani and Han (2014). Measurements for intentions to use were adapted from Zeithaml et al. (1996). The study utilized a five-point Likert-type scale for measurement, ranging from "Strongly Disagree" (1) to "Strongly Agree" (5).

4. Data Analysis

4.1 Measurement model

The results of the Kaiser–Meyer–Olkin (KMO) test indicated that the sample was adequate for factor analysis, with a KMO value of 0.70, which suggests that the data are suitable for this purpose (Kaiser, 1974). Additionally, Bartlett’s Test of Sphericity yielded statistically significant results ($p < 0.001$), supporting that there are interdependent relationships among the variables. The results shown in Table (2).

Table (2) KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.770
Bartlett's Test of Sphericity	Approx. Chi-Square	2738.813
	Df	153
	Sig.	<.001

Confirmatory factor analysis (CFA) was conducted using the Mplus program to verify the unidimensionality of each construct in the conceptual model and to assess the validity of the overall model for measuring the latent variables. The results of the analysis showed that all items loaded on the seven constructs, recorded high standardized factor loadings, with the highest being in Privacy Risk = 0.91 and the lowest being in Intention to Use = 0.75. All of these values indicate that they exceed the minimum statistically acceptable 0.70 threshold recommended in the literature (Hair et al., 2010). This demonstrates the quality of the structural representation of each construct and supports the unidimensionality hypothesis for each. Furthermore, the model's statistical indicators indicated an acceptable goodness of fit with CFI value = 0.978, SRMR = 0.042, $\chi^2/df < 3$, CFI > 0.90, TLI > 0.90, and RMSEA < 0.08. These indicators support the unidimensionality of the measured constructs. Thus, the results confirm the construct validity of the hypothesized model and support the inclusion of items

within the theoretical constructs to which they belong.

4.2 Validity & reliability

To ensure the quality of the measurement and the validity of the theoretical constructs, convergent validity and internal Consistency were assessed using established statistical indices, including Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's Alpha as shown in Table (3). The literature indicates that AVE must exceed 0.50 to demonstrate that items explain an acceptable proportion of the variance within each dimension (Fornell & Larcker, 1981). The results showed that all studied dimensions achieved AVEs above 0.50. For example, the AVE for the "Psychological Risk" dimension reached 0.782, while the "overall Image" dimension reached 0.794, reflecting the strength of the correlation between items within each dimension, indicating convergent validity. As for Composite Reliability, all CR values exceeded the minimum acceptable limit of 0.70 (Hair et al., 2019), ranging from 0.794 to 0.939. All Cronbach's alpha coefficients showed values higher than 0.70 threshold (Nunnally, 1978). For example, the α coefficient for the "Risk Related to Performance" dimension reached 0.871, while the α coefficient for "Intentions to Use" reached 0.761, indicating acceptable reliability in all cases. This indicates that the components of each dimension exhibit a high degree of internal consistency and contribute effectively to measuring the targeted theoretical concept.

Table (3) Convergent validity and internal Consistency

Construct	AVE	CR	Cronbach's Alpha (α)
Financial Risk	0.666	0.857	0.823
Privacy Risk	0.824	0.939	0.912
Performance Risk	0.681	0.868	0.871
Psychological Risk	0.782	0.913	0.909
Delivery Risk	0.669	0.859	0.845
Image	0.794	0.920	0.918
Intention to Use	0.562	0.794	0.761

To verify the discriminant validity of the dimensions studied in the measurement model, the Fornell and Larcker criterion was used. This criterion requires that the square root of the average variance extracted (\sqrt{AVE}) for each dimension be higher than the correlation coefficients between that dimension and the other dimensions in the model (Fornell & Larcker, 1981). The results in the Table (4) show that the square roots of the AVE for all dimensions ranged between 0.750 and 0.908, clearly exceeding all associated correlation coefficients. For example, the square root of the AVE for the " Intention to use" dimension reached 0.750, while its highest correlation with another dimension was 0.591 with "Risk Related to Performance". Similarly, the "Image" dimension recorded a \sqrt{AVE} value of 0.891, higher than all its correlations with the other dimensions.

Table (4) Discriminant validity

Construct	Financial risks	Privacy Risks	Performance Risks	Psychological Risks	Delivery Risks	Image	Intention to use
Financial Risks	0.816						
Privacy Risks	0.433	0.908					
Performance Risks	0.417	0.441	0.825				
Psychological Risks	0.417	0.387	0.505	0.884			
Delivery Risks	0.421	0.331	0.479	0.484	0.818		
Image	0.445	0.440	0.543	0.463	0.429	0.891	
Intention to use	0.511	0.444	0.591	0.462	0.487	0.489	0.750

5. Hypotheses Testing

This study aimed to examine the impact of various types of perceived risks—namely financial, privacy, performance, psychological, and delivery risks—on consumers' perception of Drone Food Delivery (DFD) services (consumer's perceived image) as a new service concept testing in Saudi Arabia. Additionally, the study investigated how these perceptions influence consumers' intention to use DFD services if it is made available.

Figure.2 Shows the Standardized theoretical path coefficients results.

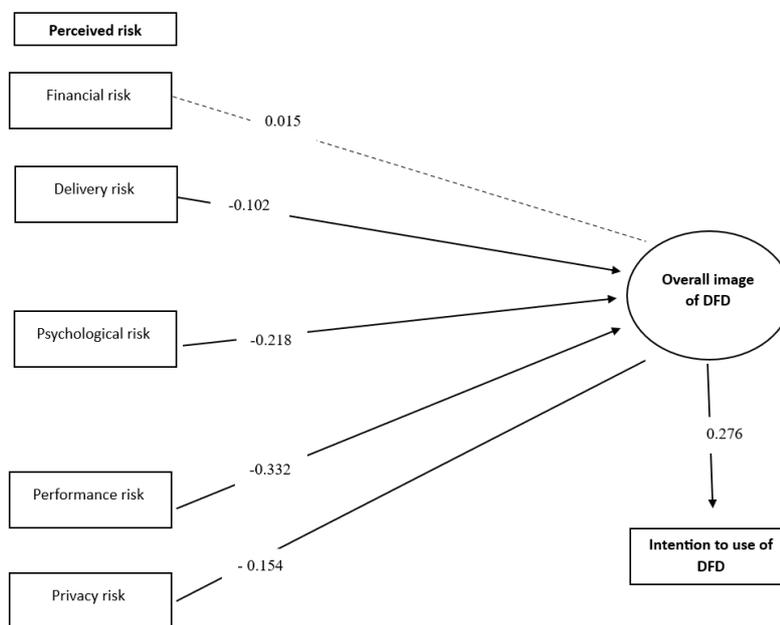


Figure 2.

Table (5) shows the results of hypotheses testing. four risk types had significant negative impacts on consumer's perceived overall DFD service image: delivery risks ($\beta = - 0.102$ and $p = 0.017$), psychological risks ($\beta = - 0.218$ and $p = < 0.001$), performance risks ($\beta = - 0.332$ and $p = < 0.001$), and privacy risks ($\beta = - 0.154$ and $p = < 0.001$). Thus, H1b, H1c, H1d, and H1e are respectively supported. On the other hand, the study showed that perceptions of financial risks ($\beta = 0.015$ and $p = 0.576$) had insignificant impacts on the overall service's image. Thus, H1a is rejected. Finally, the results confirmed that the overall DFD service image is an important variable in shaping consumer's intention to use the service, as it has a significant positive effect on consumer's intention to use the DFD service ($\beta = 0.276$; $p < 0.001$). This indicates that a more positive image of DFD leads to a greater intention to use the service.

Table (5) Hypotheses Testing

Hypothesis		B	t-value	Sig. (p-value)	Accept/Reject Hypothesis
H1a	Financial Risk → Image	0.015	0.559	0.576	Reject
H1b	Delivery Risk → Image	-0.102	-2.393	0.017	Accept
H1c	Psychological Risk → image	-0.218	-5.074	< 0.001	Accept
H1d	Performance Risk → Image	-0.332	-6.756	<0.001	Accept
H1e	Privacy Risk → Image	- 0.154	-4.676	< 0.001	Accept
H2	Image → Intention to use DFD	0.276	5.028	<0.001	Accept

6. Discussion and Managerial Implications

Service concept testing is a critical step in developing new service offerings that help to identify and mitigate potential risks. Enriching the theory of perceived risk by providing a deep theoretical perspective, this study aims to understand how risks influence Saudi consumers' acceptance of new and unfamiliar technologies such as drone delivery services. The study examined the effect of financial, privacy, performance, delivery, and psychological risks on the overall image of the DFD service as a new service concept testing. The results showed that financial risks had no impact on image, while psychological risks, privacy, and connectivity had an impact, and thus on intention to use.

The findings showed a non-significant relationship between financial risk and overall image of drone food delivery service. People don't perceive financial risk, as the high cost of drone food deliveries, an issue. Hwang and Choe (2019) confirmed that financial risks did not affect the overall image of DFD service. This result is inconsistent with Masoud (2013) who found that financial risk is a critical factor that affects consumer behavior in the context of a new technology product. The insignificant relationship seems logical in the current study because consumers in Saudi Arabia generally believe they are likely to encounter issues with the cost of drone deliveries as a sophisticated technology in food delivery. Additionally, customers focus more on performance, privacy, delivery, and perceived quality when assessing brand image of drone food delivery service, while financial risk may not significantly affect the brand's image. This means that consumers have no problem to be loaded with more cost due to the new DFD service or provide financial information because they know from experience that providing financial information when ordering food is not a critical concern. The high average of a household income in Saudi Arabia may also explain this insignificant relationship between financial risks and the overall image of DFD services.

Performance, psychological, privacy, and delivery risks have a significant negative effect on the overall Image of drone food delivery service. An interpretation of this means that when consumers feel that drone food delivery services do not seem to perform well, they will have a bad image of the service (Hwang & Choe, 2019). These results were confirmed by other studies for example: Performance risks lead to the highest levels of disappointment and distrust among consumers. If a product or service fails to meet expectations, it can severely damage a company's image and consumer loyalty (Casado-Aranda et al., 2018). According to Guo et al. (2023), performance & psychological risks are negatively impact brand attachment. When consumers psychologically feel nervous about using drone food delivery services for any reasons, they are less likely to have a positive image of the services (Hwang & Choe, 2019). Psychological concern like anxiety or discomfort associated with using new technology like drones can lead to a negative perception of the service (Alhothali et al., 2024). Moreover, Woźniak et al. (2021) showed that technologies perceived as "creepy" can evoke psychological discomfort, leading to negative perceptions and reduced adoption rates. Such psychological discomfort can lead to resistance in adopting new technologies, thereby negatively impacting their public image (Papetti et al., 2023; Hwang et al., 2023).

Privacy risks also has a significant negative effect on the overall image of the DFD service. This could be attributed to consumer's skepticism about providing personal data which is not favorable in the Saudi culture as a whole. Privacy concerns are becoming increasingly important, especially with the emergence of digital platforms. Consumers feel ambivalent and uncertain about privacy risks, which can lead to mistrust if not managed properly (Casado-Aranda et al., 2018). Disclosure of personal information through digital finance can lead to privacy breaches, impacting consumer trust and corporate image (Sharma & Sharma, 2023; Tkachenko & Jedidi, 2020). Privacy concerns can lead to reduced user engagement, thereby impacting brand image (Schmitt et al., 2021). Delivery risk as well has a significant negative effect on the DFD service overall image. The interpretation of this is that when people fear that their orders shipped may be damaged or stolen within the drone delivery journey, the result will be negative on the overall service image. This result matches the findings by (Ariff et al. 2014; Man Hong et al., 2017) who discusses how delivery risk negatively affects online store image and purchase intention such as product damage and delays.

Finally, the study examined the relationship between overall image of drone food delivery service and intention to use the service, and demonstrated a positive relationship. This means that the more positive the overall image of a drone service, the greater the desire to use the service in the future. The overall image of the consumer greatly influences consumer behavior, specifically their intention to use the service. This reinforces what Hwang & Choe (2019) have found that the image of drone food delivery service has a significant positive influence on intentions

to use the service. A study by Mokhtar et al. (2018) confirmed that image does greatly and positively influence customer behavioral intention.

The study has several implications for practitioners and businesses in the food delivery sector. Delivery companies seeking to offer the drone food delivery service in future should be aware that performance, delivery, privacy, and psychological risks have negative impacts on the Overall Image of the DFD service. Ensuring accurate delivery, reducing technical glitches, and improving the overall user experience to alleviate these risks contribute to consumer acceptance and adoption of drone food delivery service. The control of delivery risks through improving infrastructure, providing GPS, and building partnerships with telecommunications companies to improve operations is a core. Emergency plans should also be established for technical failures or weather conditions.

Restaurant investment in the delivery element is a source of differentiation and competitiveness. Speed and accuracy in delivery can be promoted as a competitive marketing advantage. Traffic congestion in some areas, such as in Riyadh, can be exploited to promote the service. Regarding privacy, which negatively impacts the image of this service, it can be improved by implementing strict data protection measures to secure customer information. Promoting speed and safety in delivery and protecting personal information can help entrepreneurs in being competitive. Using pilot demonstrations, given the new and unfamiliar nature of the DFD service, can effectively reduce psychological risks and build confidence among potential users. Organizing public and visual demonstrations of drone food delivery in action allows consumers to see the safety of the delivery process. This exposure could enhance trust and encourage acceptance of the Drone Food Delivery service to be applied in Saudi Arabia. To reduce performance risks and thus improve the service's image, food delivery companies that may provide this service in the future should invest in advanced drone technology to improve operational accuracy and efficiency. Psychological concerns can be reduced by educating customers about drone technology, safety procedures, and its benefits. In addition, a guide should be provided detailing delivery procedures, safety standards, and contingency plans to build trust. A customer service department should also be created to handle problems with this service.

7. Limitations and Future Research

The study sample was limited to Imam University students in Saudi Arabia, which introduces a potential bias and limits the generalizability of the research findings. Additionally, the majority of the participants fell within a specific age group; incorporating a more diverse age range would have been yielded more accurate insights. Although the sample was collected in Riyadh, a densely populated area that met the study's objectives, expanding the research to include other cities would enhance the robustness of the results. For future studies, if other moderating factors, such as gender, education or income, are considered, more important findings could be added. Implementing a qualitative study through direct interviews with potential consumers would provide more important insights on how to implement and improve the drone food delivery service properly.

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