

Integrating Innovation with Tradition: Drones and Takaful in Mass Disaster Victim Identification

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Abstract

The adoption of drone technology by *takaful* operators for disaster victim identification represents a promising advancement in disaster management. This qualitative study investigates the perspectives of key stakeholders on integrating drones into *takaful* practices during mass disasters. Through in-depth interviews with subject matter experts—including accounting professionals, *shariah* scholars, drone technologists, first responders, actuaries, financial regulators, *takaful* operators, and loss adjusters—this research explores the multifaceted considerations influencing drone adoption. Thematic analysis of the interview data, conducted using ATLAS.ti, reveals critical insights into technological benefits, operational challenges, regulatory compliance, ethical concerns, and *shariah* compatibility. Experts highlight the potential of drones to enhance the efficiency and accuracy of victim identification, which aligns with the *takaful* principle of mutual assistance. However, significant barriers such as regulatory hurdles, data privacy issues, and the need for *shariah*-compliant frameworks are identified. The study provides a comprehensive understanding of the enablers and obstacles in adopting drone technology from a *takaful* perspective, offering strategic recommendations to address these challenges. By fostering collaboration among technology developers, regulatory authorities, and *takaful* operators, this research underscores the importance of an integrated approach to improve disaster response and victim identification processes. The findings contribute to the evolving discourse on the intersection of technology and *takaful*, paving the way for innovative and ethical disaster management solutions.

Keyword: drone technology; disaster management; *takaful* operators; victim identification; qualitative research; *maqasid shariah*

1. Introduction

General *takaful* protects the participants from losses such as accidents, fire, and floods. Examples include insuring participants' houses against fire or vehicles against accidental damage or disaster. The number of participants in insurance and *takaful* increases yearly (NST, 2019); ironically, the trend of general *takaful* claims is also surging. Insurance Service Malaysia Berhad (ISM) statistical yearbook for 2018 stated that about RM 3,794,634,123 incurred claims for general *takaful*, which shows a considerable amount. Malaysia is a country exposed to several natural disasters, such as floods and tsunamis. When a disaster happens, it will increase the number of claims because the disaster will affect many people. Creating claims for insurance and *takaful* investigations can be a lengthy process. The insurance and *takaful* operators will have to appoint loss adjusters to validate the claims to avoid fraud cases (Shmat, 2018)

In addition, the claim process takes significant time to process and complete before the compensation can be distributed. Most *takaful* operators in Malaysia require 14 days to process the documents and investigate for general *takaful* claims. The minimum 14-day period is still time-consuming since the underlying reason for buying insurance or a *takaful* policy for most people is to relieve their burden during an unfortunate event (Muhamat et al., 2018). Notwithstanding, the minimum period can be even longer (Gomez, 2018). The period will be extended if *takaful* operators require additional documents to be examined or if the claims are caused by disasters such as floods, hurricanes, and tsunamis or man-made disasters such as fires in apartments or terrace houses, even in industrial areas that affect many policyholders. It needs to be timelier in processing the claims, which will affect the *takaful* operators' image as well as the image of the industry as a whole (Muhamat et al., 2017). Therefore, there is a need to come up with the idea of helping expedite the claim process, especially during natural or man-made disasters.

One of the ways to help the *takaful* and insurance industry is by using the latest technology, which is now widely expanded by Islamic FinTech. As mentioned, Allstate and Travellers, two reputable insurance companies in the United States, use drones to assess and measure damages. The results showed a positive impact. It reduces the time for the adjusters to assess and measure the damages, expedites the insurance claim process, human resources for other immediate tasks rather than spending too long on assessing the damages, and saves the insurance company money (Malaysia Insurance Online, 2018; Marquand, 2017). Some other insurance companies, such as Erie, Liberty Mutual, and Farmers, have used drones. Farmers Insurance (a United States-based insurance company) indicates that by using drones, the adjusters can assess damages to three houses in one hour; they usually cover just three houses in one day (Reuters, 2017), which signifies a massive difference in this case.

On top of that, there is a need for the claim process to be settled faster to assist the policyholders because they require compensation to rebuild their lives. When natural disasters get more severe, people need money to prepare and rebuild (Megan, 2017). After the unfortunate disaster, the policyholders will have to bear property losses and maybe their loved ones. They will need compensation as soon as possible to rebuild their life after the significant loss. If the claim process drags for too long, it will become a burden for them to carry out their life, as one of the objectives of *takaful* is to release the burden of the participants.

Therefore, this research intends to understand the use of drones in the *takaful* industry, particularly in the distribution of claims during mass disasters. This study will examine the opinions of *takaful* industry practitioners, actuaries, loss adjusters, first responders, forensics experts, drone experts, accounting experts, and *maqasid Shariah* experts on using drones during mass disasters to assess the benefits and challenges.

2. Literature Review

2.1 Technology Acceptance Model

The Technology Acceptance Model (TAM) is an extension of the Theory of Reason Action (TRA) and the Theory of Planned Behaviour (TPB), which attempts to understand the intention as a mediator between an individual's attitude and initial social psychology action (Slade et al., 2013). TAM is a highly respected and essential research model in determining acceptance of information systems and information technology (IS and IT) (Hallegate & Nante, 2006). The Technology Acceptance Model (TAM) proposes several factors essential in determining user attitude toward accepting a new technology, as shown in TAM, which incorporates six distinct factors (Renaud, 2008).

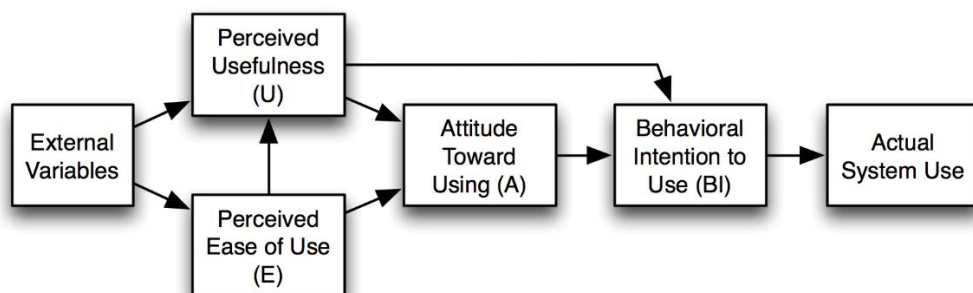


Figure 2.13 Flow of Technology Acceptance Model (TAM)

Source: Davis (1989)

- *External variables* (EV), such as demographic variables, influence perceived usefulness (PU) and perceived ease of use (PEU).
- *Perceived usefulness* (PU) is defined as 'the extent to which a person believes that using the system will enhance his or her job performance' (Davis, 1989).

- *Perceived ease of use* (PEU) 'the extent to which a person believes that using the system will be free of effort' (Davis, 1989).
- *Attitudes towards use* (A) defines 'the user's desirability of using the system.' Perceived usefulness (PU) and perceived ease of use (PEU) are the sole determinants of attitude towards the technology system.
- *Behavioural intention* (BI) is predicted by attitude towards use (A) combined with perceived usefulness (PU).
- Behavioral intention (BI) predicts Actual use (AU).

Several studies have been conducted in which the Technology Acceptance Model (TAM) was used to determine the acceptance of technology into the banking industry. In a study by Therese (2017), the technology acceptance model (TAM) was used to enhance the importance of updating older technology models and theories and find what needs to be updated or considered. A study conducted by Chupun (2016) reviewed the literature to validate the technology acceptance model (TAM) and diffusion of innovation (DOI) models for mobile service. As a result, TAM and DOI models are considered suitable for further study to predict technology adoption in the banking industry. TAM was therefore used to construct a study of acceptance of technologies for the banking industry (Chen, 2011). These models are used as a guideline for the researcher to develop questions to understand the opinions of the *takaful* operator about the use of drone technology in the industry. Technology acceptance brings considerable benefits to the *takaful* industry.

2.2 Adapting the Technology Acceptance Model (TAM) into a Qualitative Research

In qualitative research, the Technology Acceptance Model (TAM) can be adapted to provide a structured framework for understanding the factors influencing *takaful* operators' adoption of drones during mass disasters for disaster victim identification (DVI). While TAM is traditionally applied in quantitative studies, its core constructs can still inform qualitative research by guiding the exploration of attitudes, perceptions, and behaviours through in-depth interviews, focus groups, and observations.

Exploring perceived usefulness in qualitative research involves understanding participants' subjective assessments of how drones could enhance their disaster management practices. Through interviews and focus groups, researchers can probe participants' perceptions of the potential benefits of using drones for DVI, such as improving response times, enhancing situational awareness, or increasing the accuracy of victim identification (Daud et al., 2022). Qualitative methods allow researchers to explore participants' experiences and perspectives regarding the ease of using drones in disaster scenarios (Liu et al., 2024). By conducting open-ended interviews or observations, researchers can explore factors influencing perceived ease of use, such as training requirements, technical challenges, and user interface design, from the perspective of *takaful* operators directly involved in disaster response efforts.

Qualitative research allows for exploring external variables shaping drone adoption within the specific organisational and environmental context of *takaful* operators in Malaysia (Ali et al., 2021). Researchers can investigate organisational factors such as leadership support, resource availability, institutional culture, and environmental factors such as regulatory frameworks, infrastructure constraints, and stakeholder collaborations through interviews with key informants and document analysis. Through qualitative inquiry, researchers can explore participants' intentions to use drones for DVI and their actual experiences with drone adoption (Guillerme et al., 2020). By collecting rich narrative data through interviews, researchers can uncover the motivations, barriers, and facilitators influencing participants' intentions and behaviours related to drone adoption, providing insights into the alignment between attitudes and actions.

While qualitative research does not typically involve statistical testing, researchers can validate the adapted TAM model by triangulation data sources and methods (Vilaro et al., 2021). By comparing findings from interviews, observations, and document analysis, researchers can assess the consistency and convergence of evidence supporting the TAM constructs and relationships, enhancing the credibility and trustworthiness of the adapted model. Qualitative research allows for the contextualisation of findings within the broader socio-cultural, organisational, and regulatory context of *takaful* operators in Malaysia (Al-Jayyousi et al., 2022). By capturing rich, contextual data through participant narratives and field observations, researchers can provide nuanced insights into the complexities and nuances of drone adoption in disaster management, informing the development of contextually relevant strategies and interventions.

In summary, adopting the Technology Acceptance Model (TAM) in qualitative research offers a structured yet flexible framework for exploring *takaful* operators' adoption of drones during mass disasters for disaster victim identification. By examining perceived usefulness, perceived ease of use, external variables, intention to use, and actual use through qualitative inquiry, researchers can gain rich insights into the factors shaping drone adoption decisions and inform tailored interventions to promote its effective utilisation in disaster management contexts.

3. Methodology

The research design is a systematic approach to conduct the nature of the study (Creswell, 2003). It is an action plan and the direction of the study, which shows the roadmap to the researcher in conducting the sampling design, instrumentation of data collection, and analysis of procedures. The research designs are divided into three, which are qualitative, quantitative, and mixed methods (Creswell, 2009). For this research, the researcher has chosen to use qualitative study. There are seven primary characteristics of qualitative research design. It includes research concentrations, philosophical basis, the goal of the investigation, sample, data collection, the primary mode of analysis, and findings.

Characteristics	Qualitative
Research Concentrations	Quality (Nature)
Philosophical basis	Constructivism
Goal of Investigation	Understanding and description, discovery of the phenomena and generating theories
Sample	Non-random, small and purposive
Data Collection	Researcher as the primary participant, interview and observation
Primary Mode of Analysis	Inductive
Findings	Richly descriptive

Sources: Meriam and Tisdell (2016)

Table 1. Characteristics of Research Design

Table 1 shows the characteristics of research design for qualitative research. Qualitative research emphasises the quality of entities, processes, and meaning. It is described by the term ‘constructivism’ and not experimentally examined (Denzin & Lincoln, 2005). Qualitative research is more related to fieldwork and naturalism. The goal of investigation for qualitative research is to understand, describe, and discover the phenomena and generate theories. The participants for conducting qualitative research are non-random, small, and purposeful. This is due to the instrument itself, as the data collection is generally done by conducting interviews and through observation. The primary mode of analysis is the inductive approach. It starts with the research by gathering a pool of information, for example, through interviews and observation. These themes are developed into patterns, generalisations or theories that are compared with personal experiences (reality and the existing literature related to the research topic). The findings of this research are more holistic and richly descriptive.

There are five main approaches in qualitative research to frame the research study, according to Creswell (2003). This includes ethnography, grounded theory, phenomenology, and case study. This study is leaning towards a case study approach. This empirical approach investigates a phenomenon in depth and a real-life context (Yin, 2014). The use of case study design is particularly suited when a study involves the observation of an individual or unit, a group of people, a family, a class, a society, or a culture. A case study should focus on the subject with a criterion or feature the researcher wants to study. This means that a case study mainly examines individuals or events within their cultural environment (Burn, 1995).

This study intends to use qualitative research as the research design strategy because the data could be more understandable and applicable to achieve the research objectives. This is due to two reasons: the first one is that this study intends to discover the benefits of drone vis-a-vis *takaful* claims, so this study explores in depth the opinions and views of the experts on how this technology will assist their *takaful* claims so it will benefit the industry. Secondly, this study intends to get insights into the challenges of using drones by *takaful* operators during mass disasters. The challenges faced by the *takaful* industry when using drones will be

investigated to obtain in-depth information. Thus, it is assumed that qualitative research will be the most suitable design to provide further understanding and information for the research objectives of this study.

The case study will be used in this research to better understand the phenomenon (the boundaries are unclear between phenomenon and context) of the use of technology, which is drones in the *takaful* industry, to look into the benefits it brings to the *takaful* claim process. This aligns with Merriam's (2009) recommendation that case studies are appropriate for a thorough understanding of critical issues relating to practice, widening the knowledge base, and enhancing or improving practices or problems encountered in a situation.

3.1 Data Collection Method

The data collection method involves collecting information from all the relevant sources to find answers to the research problems and evaluate the outcomes. Data collection methods can be classified into primary and secondary data. This study uses the primary data collection method. Qualitative research does not involve numbers or mathematical calculations but is closely associated with words, sounds, feelings, emotions, colours, and other non-quantifiable elements. According to Cresswell (2009), three standard methods are used to get data: interviews, observation, and document analysis. For this study, the researcher used two standard methods to collect the data: interview and data analysis.

3.1.2 Interview

Interviews usually involve individuals or groups of people with a small number of participants, who will provide the information directly (Patton, 2002). Interviews can be divided into three categories: structured, semi-structured, and non-structured. This research will use semi-structured interviews, which consist of structured and unstructured questions. The structured questions are determined in this study, while unstructured questions are made when the researcher recognises additional questions about the topic.

Each participant will be asked the same questions in the same order. The researcher will conduct personal interviews where direct conversations, which are face-to-face interviews, are conducted to ask the participants questions verbally. This versatile and flexible method is a two-way communication between the interviewer and participants. The researcher will employ open-ended questions. An open-ended question encourages a meaningful answer using the subject's knowledge or feelings. This research will provide more knowledge and information if it is conducted using open-ended questions. An expert in drone *takaful* will validate the interview questions.

In line with the elements in the theory of TAM, the researcher is particularly interested in the element of ease of use and perceived usefulness.

- i. Perceived Usefulness*

This is where the researcher will ask the experts' opinions on the benefits of drones in the *takaful* industry, in particular to *takaful* claims, in the event of a mass disaster:

- How do drones benefit *takaful* operators and policyholders by reducing the time required for the claim process?
- How do drones benefit *takaful* operators and policyholders by reducing operating costs?
- How do drones benefit *takaful* operators and policyholders through the proposition of new policy and regulation?

ii. *Perceived Ease of Use*

The researcher will ask the participants about their opinions on the challenges, in particular to *takaful* claims, in the event of a mass disaster:

- How does using drones to reduce the time required for the claim process become a challenge to *takaful* operators and policyholders?
- How does using drones to reduce operating costs become a challenge to *takaful* operators and policyholders?
- How does using drones to propose a new policy and regulation become a challenge to *takaful* operators and policyholders?

3.1.3 Document Analysis

The second method to be employed is document analysis. This is where the process of evaluating documents can be printed, electronic, or both materials. The documents can be part of the study for a systematic analysis or as proof in various forms, including research articles, journals, letters, books and brochures, posters and many others (Browen, 2009). This method requires the data to be checked and interpreted to understand the best meaning, gain understanding, and develop empirical knowledge (Strauss & Corbin, 2008). For this research, the researcher will do a document analysis to gain more knowledge on this topic, which will help the researcher gain a better understanding.

3.1.4 Field Simulation

The purpose of field simulation is to measure and analyse timing of using drone versus conventional method of rescuing mass disaster victim identification. The researcher has conducted a comprehensive four-day simulation exercise held in Melaka from November 9th to 12th, 2021. The exercise was executed under the guidance of a team of researchers. Notable

participants in this simulation included the National Institute of Forensic Medicine Malaysia, Angkatan Pertahanan Awam Malaysia (APM), Aerodyne (a leading drone consultancy), Analisa Resources (M) Sendirian Berhad, the Institute of Pathology, Laboratory and Forensic Medicine (I-PPerforM), as well as the College of Engineering and the Faculty of Business and Management from Universiti Teknologi MARA.

In this simulation, mannequins symbolising victims were tactically distributed across the exercise area, with some deliberately concealed, to accurately mimic the conditions of a real-life disaster. Drones played a crucial role in each stage of the exercise, showcasing an advanced Disaster Victim Identification (DVI) process in contrast to the conventional methods employed by the APM team. The length of time each scenario took was meticulously documented. Varied weather conditions, ranging from light and heavy rain to clear skies, were incorporated into the exercise to test the resilience and adaptability of the techniques and equipment. Additionally, during interview sessions held at the site, participants contributed valuable information regarding the financial aspects of conducting such a simulation.

3.2 Data Analysis

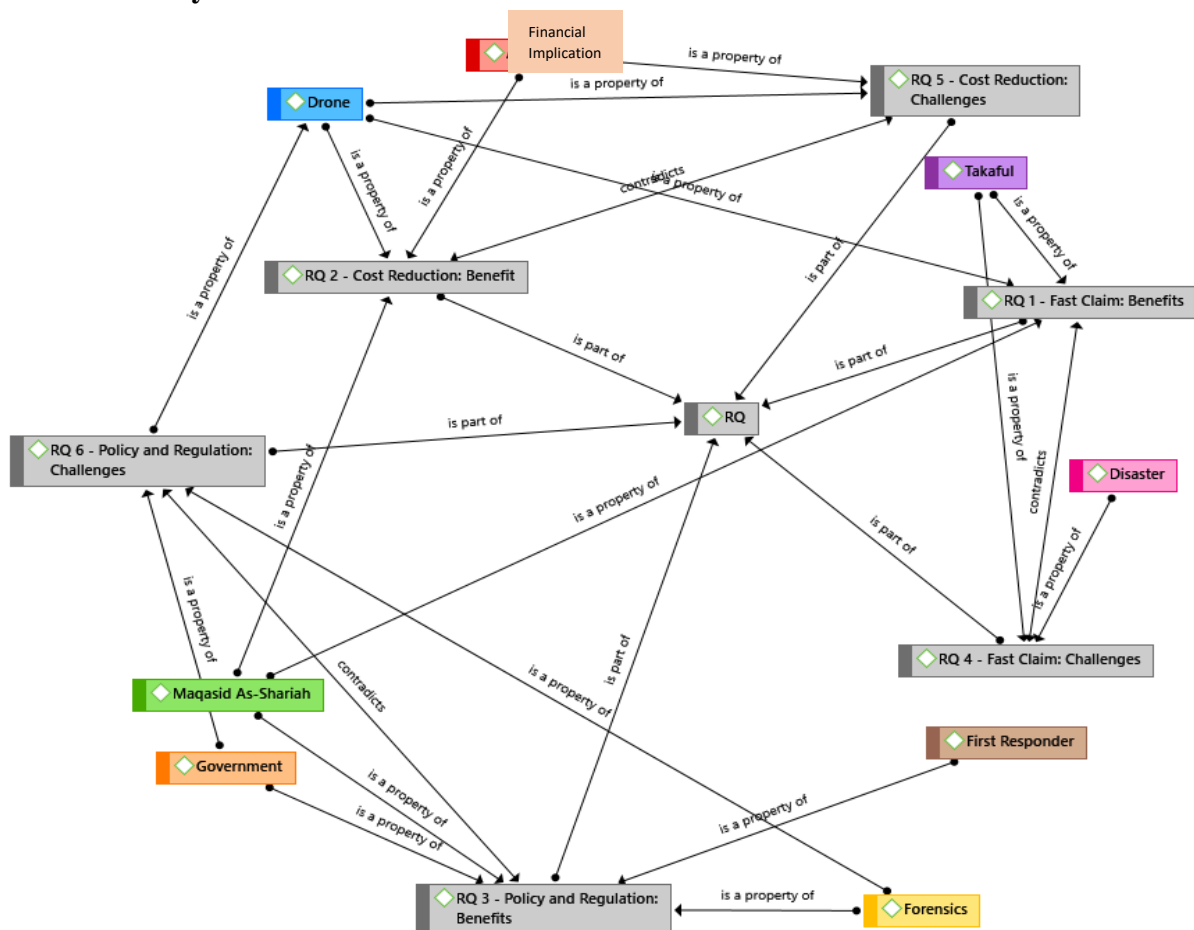


Figure 1. Research Concept Map

The diagram provided is a concept map related to the research analysis. This concept map is a visual representation of data that shows the connections among different themes to the research question. The central node in this map is labelled "RQ" for "Research Question." Surrounding this central node are various interrelated themes representing the critical components of the research. Here is how the components are interpreted in the context of the research:

- **Drone (Blue Box):** This represents the technology central to the research, indicating that drones are an essential tool being studied for their utility in mass disaster scenarios.
- **Takaful (Purple Box):** *Takaful* refers to Islamic insurance, where members contribute money into a pooling system to guarantee each other against loss or damage. The diagram suggests that *takaful* operators are critical to using drones for disaster victim identification.
- **Financial Implication (Red Box):** This refers to the financial considerations involved in deploying drones for disaster response, such as cost-benefit analysis, a common aspect of disaster management research.
- **Government (Orange Box):** The role of government likely pertains to policy and regulation, as well as funding and operational authorisation for using drones in disasters.
- **Maqasid As-Shariah (Green Box):** This refers to the objectives of Islamic law, which might be relevant in discussing how *takaful* operates within the bounds of Islamic principles, particularly in humanitarian efforts such as disaster victim identification.
- **Disaster (Pink Box):** The context in which drones are deployed, which in this case involves mass disasters that require quick and efficient victim identification.
- **First Responder (Brown Box):** Individuals or organisations that are the first to arrive and provide assistance at the scene of an emergency, such as a mass disaster. The map suggests that drones could aid these first responders.
- **Forensics (Yellow Box):** Refers to applying scientific methods and techniques to investigating crime, which in the context of this research would be the scientific identification of disaster victims.

Research Questions (RQ1 to RQ6): Each grey box with an RQ label refers to a specific research question or aspect being investigated. For example, "RQ1—Fast Claim: Benefits" explores how drones can speed up the insurance claims process after a disaster, while "RQ4—Fast Claim: Challenges" examines the difficulties faced in this application.

The arrows represent the relationships between different concepts, such as how drones are related to financial implication considerations or how government policies impact the application of drones in *takaful* operations during disasters. The arrows labelled "is a property of" suggest that the connected concept characterises or is an attribute of the concept it points. Overall, the diagram serves as an outline for the research, showing how drones can play a role in various aspects of disaster response and victim identification, specifically from the perspective of *takaful* operators within the Islamic legal and ethical framework. It emphasises the multifaceted nature of the research, touching on technology, finance, law, ethics, and operational challenges.

4. Result

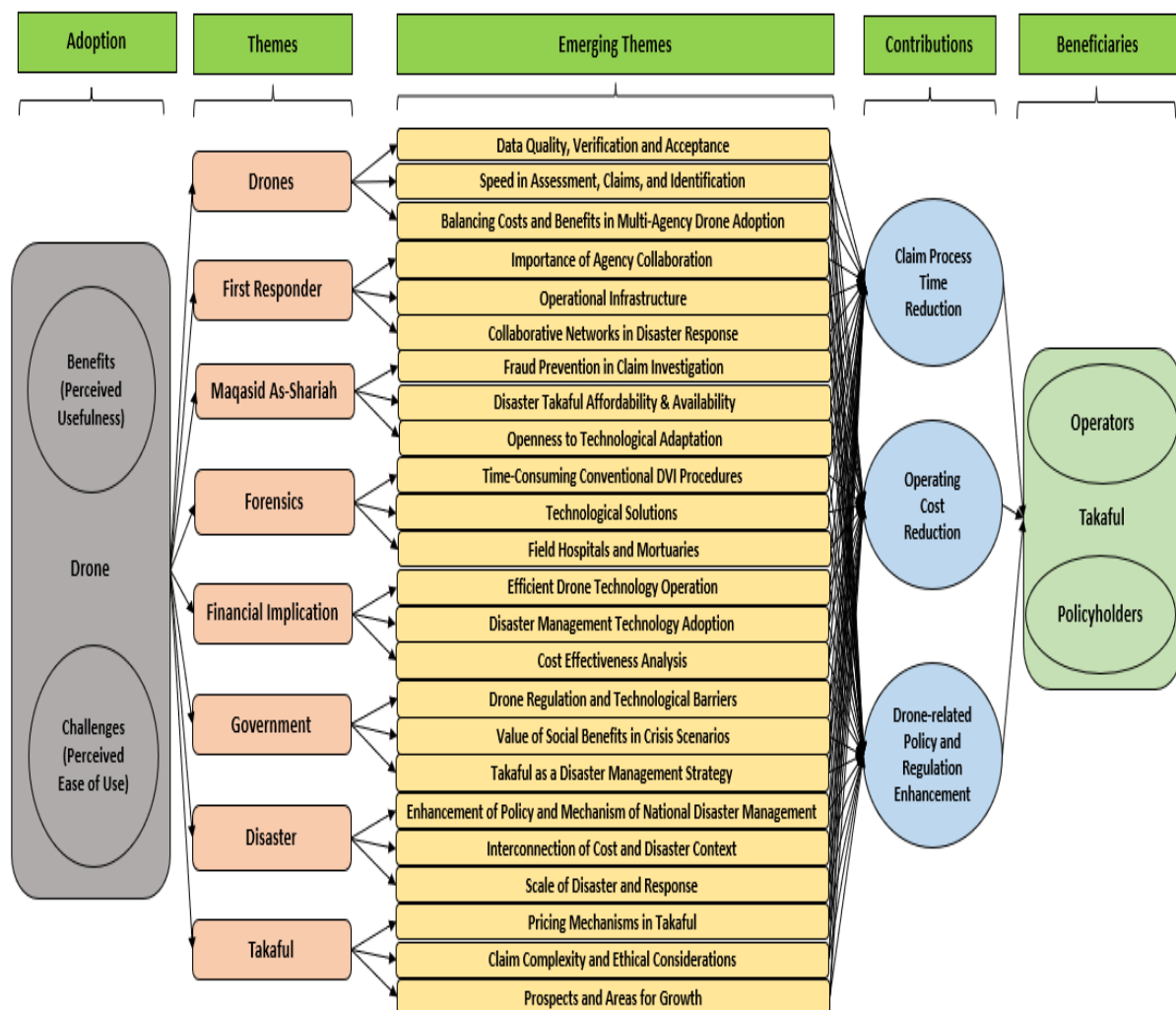


Figure 2. Adoption of Drones during Mass Disaster by *Takaful* Operators for Disaster Victim Identification Model

The research finds that there are three important elements highlighted which are the impact and integration of drones in disaster management, focusing on the contributions and benefits across various themes and the adoption process. The data suggests that the adoption of drones is influenced by how their advantages and potential difficulties are perceived and their user-friendliness. The themes represent different areas of application or stakeholders involved in the disaster management process. The emerging themes range from specific issues like data quality, speed of assessment, and cost and damage reduction to broader concepts such as collaboration, operational innovation, and technology adoption. The various themes indicate different approaches to drone integration, where operational, technological, financial, and collaborative aspects are all considered important. This suggests that using drones contributes to the efficiency of claim processing and operating cost reduction in disaster management. The beneficiaries, which include operational aspects, imply that the advantages of drone usage extend across practical, conceptual, and regulatory domains. The contributions of drones feed into the themes and the emerging themes, which in turn affect the adoption of drones. This interconnectivity highlights the importance and practical use of drones and the broader themes they influence.

5. Discussion

This study is grounded in qualitative expert opinion regarding *takaful* operators' potential deployment of drones. In addition, we examine the Social Cost-Benefit Analysis (SCBA) concept, which recognises the significance of social costs and benefits in evaluating cost efficiency. This contrasts with the standard cost accounting approach, which focuses solely on measuring private costs and benefits.

This will be particularly advantageous for initiatives that yield extensive societal advantages despite their substantial initial expenses. Such interventions can be rationalised by the significant social benefits they offer, which contribute to society's overall well-being of the affected community. This study also examines the potential enhancements of the Cost-Effectiveness Analysis by integrating drones to assess the new dimensions of social costs and benefits. The analysis incorporates insights from the *Maqasid Shariah* framework. This study introduces a novel approach to assessing cost efficiency within the *takaful* business. Specifically, it suggests expanding the financial perspective to encompass externalities that impact third parties and the broader public. This aligns with the principles of *Maqasid al-Shariah*, upon which the Islamic finance industry is founded.

The use of drones in Malaysia has been observed across multiple sectors. However, the outcomes of this investigation affirm that the *takaful* business still needs to embrace the incorporation of this emerging technology. The study additionally demonstrates the viability and significant potential of drones to improve the effectiveness of the *takaful* business, as evidenced by the advantages they offer to the various players involved. Therefore, this study proposes that *takaful* operators in Malaysia and other well-established *takaful* markets should carefully evaluate the implementation of drone technology in their *takaful* business operations. This study establishes the positive impacts that can be generated throughout both the pre-underwriting phase and the claim (damage assessment) procedure, as shown by expert opinions. One of the primary advantages is in the realm of accuracy and precision in

determining underwriting costs. Additionally, there is a notable enhancement in the speed and efficiency of the claim management process and a reduction in the potential for fraudulent activities.

To mitigate the initial financial burden associated with drone technology, it may not be imperative for each *takaful* operator to establish its drone unit independently. Instead, a cost-sharing approach could be adopted through collaborative efforts within the industry, facilitated by initiatives spearheaded by the industry's association. Therefore, the expenses related to this can be collectively covered by *takaful* operators through organisations like the Malaysian *Takaful* Association (MTA) or other nations with well-established *takaful* markets, such as those in the Gulf Cooperation Council (GCC).

The utilisation of drones has been embraced by numerous traditional insurance companies in industrialised nations, thus establishing a global precedent for the *takaful* business. In the event of a mass disaster, it is recommended that national-level disaster management agencies, such as the National Disaster Management Agency (NADMA) in Malaysia, assume responsibility for providing drone services. These agencies should also facilitate the provision of pertinent data derived from drone technology to *takaful* operators, ensuring that the associated expenses remain modest.

However, the adoption of drones in the operations of *takaful* operators may not be feasible due to the financial implications it would have on the companies' financial statements. The primary concern of the shareholders, who also serve as principals in the *takaful* business activities, revolves around this aspect. Adopting drones in *takaful* activities can be practicable through a coordinated effort by the industry facilitated by the government's organisation.

In terms of limitations, this study is a component of a more significant research endeavour. Therefore, this work focuses on one aspect within the broader scope of the primary research project. However, this work has successfully offered initial insights into a relatively neglected subject in *takaful*. Similar to other research endeavours conducted during the ongoing COVID-19 outbreak, significant delays have been experienced. However, these initial findings have the potential to make a valuable contribution to the existing body of knowledge in this field and can be referenced when developing industry policies.

6. Conclusion, Implication, and Recommendation

In conclusion, it is recommended that future research endeavours include a cross-country analysis to explore the feasibility of integrating drones into the operations of *takaful* operators. Such a comparative study would contribute to a more comprehensive understanding of this matter on a worldwide scale. The significance of this matter lies in the fact that the geographical location of a country can potentially impact the urgency for *takaful* operators to include drones in their operations. For example, it is hypothesised that countries that are susceptible to natural disasters, such as earthquakes, forest fires, hurricanes, and others, are more likely to use drones to expedite the processes related to damages and insurance claims. The practices of insurers in the United States of America evidence this.

Although not government entities, *takaful* operators are significant in search and rescue (S&R) operations. Their organisation collectively provides funding for drone-assisted disaster victim identification. This collaborative effort by the *takaful* business contributes to the

country's welfare during terrible disasters. Disasters can manifest in both natural and man-made forms. When a disaster occurs in a country, inadequate planning can lead to widespread effects for the entire population, with even private firms experiencing a domino effect. Hence, it is imperative to consider the use of drone-assisted Disaster Victim Identification (DVI) by all stakeholders, including *takaful* operators and conventional insurance companies. Although not bound by *Shariah* principles, the latter also provides risk management services.

The present investigation has yielded various developing issues that have been thoroughly examined throughout this research. This study contributes to the existing literature in this field, serving as a valuable resource for future researchers and scholars. Future research endeavours could include delving deeper into the developing themes that have been highlighted in order to extract more profound insights that can drive policy development and provide guidance for the *takaful* industry and disaster management authorities.

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