Safety Science 189 (2025) 106900

Contents lists available at ScienceDirect

Safety Science

journal homepage: www.elsevier.com/locate/safety

Investigating the construction professionals' perspective on the new building safety act in the UK: A sentiment analysis of media data

Muhammad A. Yamusa [a], Jamiu A. Dauda [a,*], Zainab T. Jagun [a], Abdullahi B. Saka [b], Ramith Rajan [a], Adekunle S. Oyegoke [a], Saheed O. Ajayi [a]

[a] Construction Informatics and Digital Enterprise Laboratory, School of Built Environment, Engineering and Computing, Leeds Beckett University, Leeds LS2 8AG, United Kingdom

[b] Westminster Business School, University of Westminster, London, United Kingdom

ARTICLE INFO

Keywords:
Building safety
Building safety act 2022
Professionals' perspective
Sentiment analysis
Social media

ABSTRACT

Existing research on constructional professional attitudes towards fire safety and evacuation has predominantly employed traditional methodologies. While these methods have provided valuable insights, they are limited in their ability to capture the full spectrum of the stakeholders. Moreover, a significant gap exists in the literature regarding the broader population's concerns about how the industry experts perceives and responds to building safety regulations, particularly in the context of new legislation like the Building Safety Act (BSA) 2022. To address these gaps, this study adopts a novel approach by analysing social media data, specifically YouTube, to capture a wider range of public sentiments towards the BSA 2022. A total of 3577 data points reflecting the general public's views were gathered, processed, and examined using sentiment analysis, k-means clustering and Latent Dirichlet Allocation text mining techniques for topic modelling. Findings reveal nine clusters each for the positive and negative sentiments. The overall findings reveal that the public expressed positive sentiments (20 %), negative sentiments (4 %), and neutral sentiments (76 %) towards BSA 2022. The study posits recommendations from the public's sentiments for policy makers to leverage.

1. Introduction

Fire incident is a common disaster which has considerable impact on the lives, well-being, and property of people. Fire incidents are more prone to cities with myriad high-rise building construction due to the teeming population, where availability of land is a major concern (Pérez-Urrestarazu et al., 2015). These high-rise buildings are equipped with technologies like lifts, solar panels, and heating devices that tend to subject the buildings to a higher probable occurrences of fire incidents (Cleef et al., 2024). The purpose of the high-rise buildings is to house large number of individuals. The size and complexity of the high-rise buildings make it difficult to carry out evacuation and rescue operations for people and their properties, as well as extinguish fire in the event of an outbreak (Liu et al., 2012). Globally and in the UK, tremendous losses in form of lives, properties and economy have been recorded due to fire incidents (Kuo et al., 2022; Ronchi and Nilsson, 2013). One of the tragic events in recent times for the UK, termed '*the biggest fire in Britain for generations*' is the Grenfell Tower fire, where a 24-storey high-rise building caught fire. The Grenfell fire incidence recorded 71 immediate deaths. Following the Grenfell fire, the UK Government constituted a review on fire safety approach, which became a turning point for fire safety regulation in the UK. The review found that existing regulatory system is not fit for purpose (Hackitt, 2018). The review report uncovered flaws in the existing regulatory system including inadequate audit trail and insufficient quality assurance (Hackitt, 2018). These flaws were underpinned by ignorance of regulations and guidelines, indifference to quality assurance, ambiguity in assigning roles and responsibilities, as well as poor enforcement of regulations (Hackitt, 2018). The revelations contained in the report along with its recommendation for a radical overhaul of existing regulatory system to futureproof the system led to the enactment of the Building Safety Act (BSA) 2022 for the construction of high-rise and complex buildings. The Act '*makes ground-breaking reforms to give residents and homeowners more rights, powers, and protections – so homes across the country are safer*', especially against fire.

While the UK government plays a crucial role in promoting fire safety

* Corresponding author.
E-mail address: j.a.dauda@leedsbeckett.ac.uk (J.A. Dauda).

https://doi.org/10.1016/j.ssci.2025.106900
Received 4 August 2024; Received in revised form 9 May 2025; Accepted 10 May 2025
Available online 14 May 2025

regulations, the absence of a strong public support for these regulations often results in the application of the regulations to a limited number of government projects or face challenges due to excessive government intervention. The lack of public interest in existing fire safety regulations highlights the need for a deeper understanding of public attitudes and concerns to gain their buy-in (Hackitt, 2018). While knowledge of public perceptions does not guarantee acceptance, it is essential for successful implementation. Ensuring that fire safety solutions address actual problems, as emphasised by Shad et al. (2021), is key to achieving policy goals and effectively targeting the right users. Public input not only shapes fire safety policies but also facilitates communication between policymakers, stakeholders, and the public, guiding educational efforts to promote effective fire safety practises.

Existing research on public attitudes towards fire safety and evacuation has predominantly employed traditional methodologies such as observations, structured questionnaires, and interviews (Hostetter et al., 2024; Willem Menzemer et al., 2024). While these methods have provided valuable insights, they are limited in their ability to capture the full spectrum of public sentiment, particularly during critical moments. Tetteh et al. (2023) and Wu et al. (2021) argue that such methods risk introducing bias and fail to adequately capture the nuanced emotions and sentiments of individuals. Moreover, a significant gap exists in the literature regarding the broader population's concerns, as most studies have focused on specific groups of stakeholders (Hostetter et al., 2024; Willem Menzemer et al., 2024).

This narrow focus has left a critical gap in our understanding of how general construction professionals perceive and respond to fire safety regulations, particularly in the context of new legislation like the Building Safety Act (BSA, 2022), particularly as the effectiveness of the BSA (2022) for improving safety policies remains understudied, despite its potential importance for policy implementation and compliance. Therefore, there is a gap in understanding how construction professionals perceive the BSA (2022) in regulating building safety, which is critical to the success of this regulation. This leads to the important research question: "How does construction professionals' perception influence the acceptance and effective implementation of the BSA (2022) in regulating building safety?" To answer this research question, this study adopts a novel approach by analysing social media data, specifically YouTube, to capture the professionals' sentiments towards the Building Safety Act 2022. This method allows us to:

1. Access a broader and more diverse sample of opinion, moving beyond the limitations of traditional survey methods.
2. Capture spontaneous and unfiltered reactions, potentially reducing the bias introduced by structured questioning.
3. Analyse sentiments in real-time as they evolve in response to the new legislation.
4. Explore the link between industry expert perception and potential policy effectiveness, contributing to the theoretical understanding of how professionals' sentiment influences fire safety policy implementation.

The utilisation of social media data as a means of gathering information from the public is an expanding field of study and innovation, offering a vast and potentially relevant data source that is both freely accessible and readily available, surpassing the time constraints associated with traditional survey methods (Tetteh et al., 2023). The widespread popularity of YouTube serves as an exceptional platform for disseminating pertinent information and advocating for environmentally friendly and convenient use (Sui et al., 2022; Tetteh et al., 2023). It effectively captures the genuine viewpoints of the general public towards a particular practice (Tetteh et al., 2023). By providing a more comprehensive and diverse understanding of the construction professional's perspectives on fire safety, this study makes a significant contribution to the existing body of knowledge. Consequently, it can assist policymakers and authorities in refining the promotional strategies and policy aspects of the Building Safety Act 2022. In other words, policymakers can develop more suitable interventions or fine-tune existing policies by incorporating the socio-economic and cultural considerations of the multi-disciplinary experts into the technical interventions and best practices, thereby establishing a more effective approach to fire safety for residents.

2. Literature review

2.1. Fire safety evolution in the UK

The fire safety legislation in the UK has been chaotic due to its reactive nature. The UK has tackled fire safety after incidents, failing to provide novel and strict course of action to avoid casualties and promote accountability in the event of negligence (Hackitt, 2018; Shad et al., 2021). This has led to an increase in drastic fire incidents from the mid-20th century to the early 21st century (Shad et al., 2021). For example, the 1991 Knowsley Height fire outbreak resulted from rubbish collection in Huyton, Merseyside, England. The fire spread via a 90-millimetre opening that is between a newly installed façade and the external wall, starting from the ground floor of the building (White and Delichatsios, 2015). The new refurbishment that included the thermal installation failed to comply with the provision of the guidelines for the design of high-rise buildings for residential purposes, i.e., the GLC Means of Escape from Fire Guide (1974) (Billington et al., 2002). The refurbishment also did not include the provision of a structural fire break to prevent the fire from spreading upwards (Holland et al., 2016).

Another notable example of fire incidence that occurred recently is the Grenfell Tower outbreak. The outbreak started as a result of an exploding fridge on the 4th floor, expanding up rapidly to upper floors of the 24-storey building. The spread of the fire was facilitated by the cladding that was not installed in accordance with the legislative provisions, thus failing to meet the minimum required standards. The outbreak resulted in 72 fatalities, which according to the Ministry of Housing, ranks as the worst and deadliest fire incidence in the UK in recent years. The report on this incident points to the absence of well defined, and enforced fire safety policies (Hackitt, 2018).

The lowest fatalities on record resulting from fire for a single year since 1981–1982 is 253, in 2018–2019 (Shad et al., 2021). This calls for a stricter fire safety regulation that addresses fire safety and the general building safety from a proactive perspective. Hence, leading to enactment of Building Safety Act 2022 to improve the standard of buildings and the safety of people in or about buildings.

2.2. Fire incidents and high-rise buildings

The definitions and categorisations of high-rise buildings vary across countries. In the UK, a high-rise building is a building that is at least 24 m in height from the ground level (Giang, 2021). This definition considers the lowest measurement point to be the lowest side of the surrounding ground, while the highest point of measurement is taken to be the top floor roof. This is within the general average range of 23–31 m height from different regions (Giang, 2021). The general lowest measurement point is taken to be the level on the ground that fire vehicles access.

High-rise buildings present unique fire safety challenges different from middle-rise and low-rise buildings. These challenges require more stringent guidelines in ensuring fire safety. These high-rise buildings are used for different purposes, which comprise residency, offices, schools, hotels, laboratories, hospitals, and factories. The purpose which a high-rise building serves impacts how the building users egress from the building, thus the evacuation effectiveness of the building (Hall, 2013).

Users of high-rise residential buildings stay with their families, including elders and babies. This leads to a more difficult evacuation. Additionally, high-rise residential building users have important items and belongings (Proulx, 1995). Residential users of high-rise buildings

also carry out different tasks and activities with the building including sleeping, showering, and undressing. Such activities consequently lead to delayed evacuation in the event of fire. Thus, leading to a longer evacuation period in high-rise residential buildings (British Standards Institute, 2019; National Fire Protection Association (NFPA, 2011). Finally, a psychological defence mechanism known as compartmentalisation complicates the process of evacuation by preventing the smooth spread of knowledge, as well as upsetting social ties (VandenBos, 2006).

The BSA 2022 considers high-rise buildings as high-risk buildings (HRB) having at least seven floors or attaining at least 18 m in height. This is quite different from the average range of 23–31 m height from different regions. Also, the scope of the new BSA 2022 is on high-rise residential buildings, hospitals, and care homes.

2.3. Fire safety and building users' attitude

The duty of care lies with the designers and constructors in ensuring that the buildings delivered are safe and will provide the necessary protection in the event of fire to enable evacuation of the occupants. However, building occupants have a major responsibility as well to facilitate fire safety. Fire safety becomes more efficient when high-rise residential building occupants are aware of the fire safety equipment functions like sprinklers, fire suppression, and smoke detectors (Nimlyat et al., 2017). Also, previous experiences affect the attitudes and preparedness of occupants on fire safety (Glauberman, 2018; Ramachandran, 1999; Zmud, 2008). Meanwhile, it has been found that there is a lack of complete understanding of the behaviours of occupants relating to evacuation (Kuligowski (2011)).

Findings from the literature reveal a lack of a comprehensive study on how the public perceives the regulations guiding building safety. Existing studies only focused on exploring the attitudes of the public towards evacuation during fire incidents (Hostetter et al., 2024; Willem Menzemer et al., 2024). Hence, understanding the attitudes and perceptions of the construction professionals on the new BSA 2022 legislation calls for an analysis of the diverse population on a city scale. This study, therefore, achieved this aim by analysing YouTube data on BSA-related issues.

3. Methodology

This study employs a qualitative analysis technique to examine the public's sentiment towards the new Building Safety Act. The introduction of BSA 2022 has generated varying reactions from construction stakeholders and the public with different comments, videos and posts on various social media platforms such as Facebook, Instagram, Blogs, X (formerly Twitter), Reddit, LinkedIn and YouTube. Thus, making social media data a rich source of data to investigate the overall sentiment of the public about the BSA 2022. This is in line with the submission of Sui et al. (2022) , who asserted that social media platforms serve as a rich source of freely accessible data to examine the trends and sentiments of certain populations on any specific issue. In this study, an initial search of several social media platforms was conducted, and discussions related to the BSA 2022 were found on all the social media platforms. However, most of the posts on X, LinkedIn and Instagram are very brief, providing limited details about the Act. On the other hand, YouTube provided extended discussions through multiple webinars and workshop videos about BSA 2022. Previous studies, including Yoo and Kim (2012) and Tetteh et al. (2023) have leveraged YouTube data for research owing to its popularity as the most widely used video hosting website. YouTube has over 2 billion active users, approximately 47 % of all global internet users every month (Dean, 2024). As such, this study selected YouTube as the source of data. The choice of YouTube is further supported by Wankhade et al. (2022), who pointed out that sentiment analysis can be performed on data extracted from audios, videos, and locations, asserting YouTube data as a suitable and acceptable research tool. The comprehensive methodological framework for this study comprises three key steps, including data preparation (data extraction and preprocessing), sentiment analysis, and content analysis (data clustering and topic modelling) as illustrated in Fig. 1.

3.1. Data preparation

3.1.1. Data extraction

A search was conducted on YouTube on May 21, 2024, using "building safety act 2022″ as the keyword and over 300 videos were returned. Thereafter, inclusion criteria of over 1,000 views, webinar and conference videos were imposed to focus on videos that have gained significant public attention and provide a high level of engagement beyond just the views of the video creators. The rationale for limiting the videos to conferences and webinars is to unveil the multidisciplinary perceptions of the Act, as multiple stakeholders within the construction sector are expected to comply with the BSA 2022. Moreover, conferences and webinars allow for interactions with the public, which is vital for getting their perceptions of the Act. More than 100 videos were returned and subjected to initial screening, where only videos in English language were considered. When using videos as data sources in research, it is important that the selected videos directly address the issue under investigation (Fitzgerald et al., 2013). Duplication must also be avoided to ensure content diversity, a principle aligned with the concept of thematic saturation in qualitative research (Dauda et al., 2024). The concept of saturation, rooted in grounded theory, typically suggests an ideal sample size of 20 to 30 data sources (Creswell and Creswell, 2023). In this study, duplications were removed and 26 videos primarily focused on Building Safety Act 2022 (BSA were selected for quality evaluation prior to the detailed analysis. The sample of 26 videos was deemed appropriate based on the aforementioned criteria. Similar studies that have used video data in the AEC domain, such as Tetteh et al. (2023), have utilised comparable sample sizes (31 videos), further supporting the adequacy of the chosen sample. Thereafter, each of the 26 videos underwent an additional screening process to ensure their suitability and reliability of the data for in-depth analysis.

Several measurement tools such as DISCERN and Journal of the American Medical Association (JAMA) benchmark tools have been developed to measure the quality and reliability of data/information used in the medical field (Charnock, 1998; Silberg, 1997). These tools have been adapted to other fields, including the built environment. However, these tools were originally developed to assess written information or websites, not videos (Azer, 2020), thus making them unsuitable for this study. Meanwhile, the Medical Quality Video Evaluation Tool (MQ-VET) was specifically designed to assess the content, quality and reliability of YouTube videos for medical professionals (Guler and Aydın, 2022) and has recently been adapted in other study areas including a study in the built environment field by Tetteh et. al (2023). Therefore, an adapted version of the MQ-VET was utilised to evaluate the 26 selected videos. The quality of the information in the 26 videos was assessed using the 15-item instrument in the MQ-VET by two of the authors. The evaluation tool employed a five-point (1–5) rating scale, with 1 and 5 indicating a strongly disagree and strongly agree response to the quality of the data in each video, respectively. After the rating of each of the 15 items, the mean score was calculated and used to classify the overall quality of each data source. The classification was based on five scaling ranges previously used by (Cassidy and Baker, 2016; Szmuda et al., 2020) with mean scores of (63–75) as excellent, (51–62) as good, (39–50) as fair, (27–38) as poor, and 16–26 as very poor. The components of the 15-item instrument include clarity of the information in the videos, relevant to the concepts of the subject under investigation. In adopting the MQ-VET tools, two of the items that specifically focus on medical themes were modified to address building safety issues following the approach of Tetteh et al. (2023). The composite mean scores of all 26 videos fall under the excellent category, showing the reliability and certainty of the data to address the study aim and were subsequently transcribed into 3577 textual statements for detailed

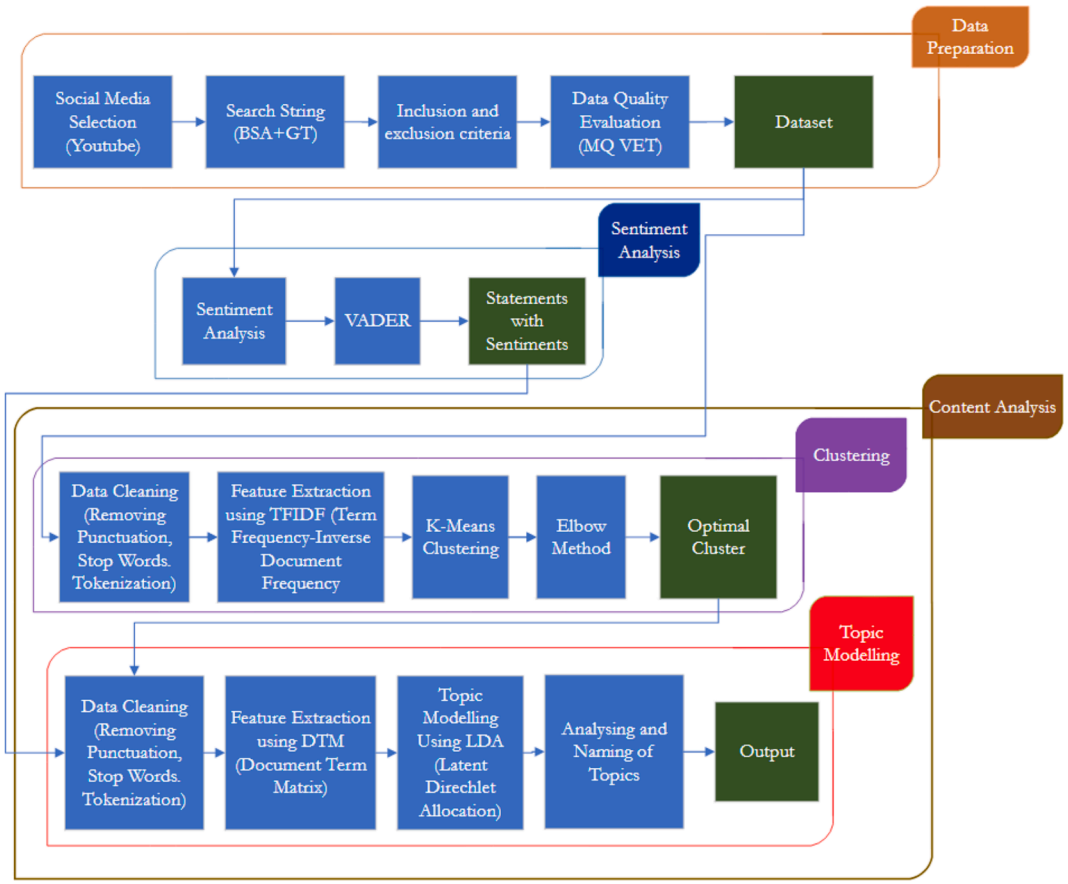


Fig. 1. Methodological framework for analysing public sentiment from social media data (Source: Authors).

analyses. Statements such as introductions, citations of professionals, and other non-value-adding statements were removed and do not form part of the 3577 statements.

3.1.2. *Data pre-processing*

The 3577 transcribed textual statements were further cleaned and transformed manually to remove irrelevant information. The irrelevant information removed from the cleaning include salutations (such as hello and hi), thank you, and goodbyes, as these would not add value to the results. This cleaning did not reduce the number of statements, it only removed non-value-adding parts of long statements. The dataset was then converted to .csv format to allow for readability and usage by various tools for sentiment analysis and modelling. The pre-processing of the data also includes transforming the dataset into all lower cases, removing the stop words like "the", extra whitespaces and unnecessary punctuations. Finally, a vectorisation using Term Frequency Inverse Document Frequency (TF-IDF) was conducted on the dataset to develop a class matrix to associate each row and column with a document and term, respectively. This helps to convert data into a numerical format suitable for clustering (Dauda et al., 2024a) and also boosts the relevance of each term in the dataset (Abdullahi et al., 2024b, 2024a).

3.2. *Sentiment analysis*

In recent years, Sentiment Analysis, otherwise known as Opinion Mining or Opinion Analysis, has become widely accepted among businesses, governments, organisations and researchers (Sánchez-Rada and Iglesias, 2019). This is because many users utilise various social media platforms such as X, YouTube, Reddit, Instagram, LinkedIn, and Facebook to share their viewpoints and opinions on specific issues. To effectively monitor these public opinions and support decision-making processes, user-generated data are used for automated sentiment analysis leveraging on the advancement in natural language processing (NLP), knowledge modelling, data mining (Wankhade et al., 2022) and rule based tool such as Valence Aware Dictionary and sEntiment Reasoner (VADER) package developed by (Hutto, 2021). Other tools for carrying out sentiment analysis include SentimentR, Tidytext, and Syuzhet (Wankhade et. al, 2022). These tools have been described as complex and less optimised to handle large datasets such as video data used in this study. Meanwhile, VADER is very useful in analysing media and video data because of its ability to account for nuances that are often emanated from video data (Hutto, 2021). As such, VADER has been employed to analyse people's perceptions regarding the new Building Safety Act in the UK.

VADER was used to determine the sentiment polarity of every statement within the cleaned dataset and to calculate the overall sentiment. The selection of VADER for this study was based on its ability to handle valence shifters such as negators (e.g., *never, not, no*), as well as negations in the form of contractions (e.g., *wasn't very good*). Dadvar et al. (2011) argued that these negators, if not properly handled, have the potential to alter the polarity of statements, making their treatment a crucial aspect of sentiment analysis. However, unlike most sentiment analysis packages, VADER handles negators by addressing statements with sensitivity to polarity and intensity of expressed sentiments (Hutto, 2021). Additionally, VADER is applicable across various domains.

The vectorised dataset, which is the outcome of the pre-processing step, served as the input to the VADER package to carry out the sentiment analysis using a Python script. The script commands include initialising *SentimentIntensityAnalyser* from vaderSentiment to pass the pre-processed data into the polarity_scores function. The analysis returned a multiclass output ranging between −1 to 1 i.e., positive, neutral and negative. The output was further analysed to compute the sentiment

polarity and sub-polarity.

3.3. Content analysis

3.3.1. Data clustering

This study adopted K-Means Clustering, which is widely regarded as an efficient unsupervised machine learning algorithm for grouping large datasets into non-overlapping distinct groups (Ikotun et al., 2023). The k-means clustering has been identified as a suitable clustering approach due to its efficient processing of large datasets like the one available in this study. The lack of the need for prior knowledge of document classes, eliminating the need for training; its operation without human intervention; its minimal memory requirements; cost-effectiveness and convenient approach that is highly efficient for data clustering as identified by Wankhade et al. (2022) also make it appropriate for this study.

For the clustering, the 3577 transcribed textual statements from the data extraction step served as input data to implement the K-Means clustering using Python. The study adopted the "Elbow method" to determine the optimal k-values to automatically break down the dataset into an optimum number of clusters. The outline of the scripts for K-Means clustering includes the removal of punctuation, tokenisation, and vectorisation using Term Frequency-Inverse Document Frequency (TF-IDF) to render it into a numerical format appropriate for clustering purposes. This step revealed the number of clusters which were used in thematising the various sentiments. Prior to the implementation of k-values, a manual approach of clustering was conducted to identify the appropriate number of clusters in the dataset from one video. The manual approach involved four of the authors going through the sentiments independently to come up with the number of themes for the positive and negative sentiments. This helped to validate the output of the K-Means clustering algorithm and ensure that the k-value is appropriate for the dataset.

3.3.2. Topic modelling

Topic modelling is a text mining technique that utilises a variational expectation–maximisation (EM) approach to uncover the underlying thematic structure within a document text (Blei, 2012). Jiang et al. (2016) highlighted that Latent Dirichlet Allocation (LDA) is the most adopted topic model owing to its capacity to yield a precise assignment of documents to unambiguous topics. As such, an implementation of LDA in R similar to Grun and Hornik (2011), was employed in this study. By applying this package to the matrix developed, the hidden themes in the dataset were uncovered and arranged into different topics accordingly. It is important to note that the number of topics, denoted as "k", derived from the K-Means clustering was specified to guide the LDA in topic allocation. To estimate the latent variables, the variational EM method was then utilised, using the variational posterior probabilities to draw conclusions (Grun and Hornik, 2011). The LDA was employed separately on the positive and negative sentiments to cluster the respective sentiments. The output from VADER and k-means clustering from the sentiment analysis and data clustering sub-sections served as inputs for achieving the topic modelling.

The LDA model was employed to identify distinct topics, leveraging the optimal number of clusters (9) established during the clustering phase. To enhance the precision of the outcomes, the LDA executed 15 iterations as previously established by Dauda et al. (2024a) that 15 passes of LDA run improve accuracy. It allocated sentences to the primary topics according to the distribution of topics, ensuring that each sentence was classified under the most pertinent topic. This process involved assigning cluster labels to each sentence, thereby organising similar sentences based on their textual characteristics. To validate the outcome of the LDA model, four of the authors carefully reviewed all components under each cluster. Thereafter, topic naming was conducted by reviewing the sentences under each cluster to assign a name to the clusters. This was achieved without following any established framework other than using insight from the key components of the BSA 2022. Using such an approach allows the emerging themes to be unique and connected to the underlying terms of the subject rather than generic naming as observed in earlier study of Dauda et al. (2024b). The review of cluster components shows that the positive and negative statements highlight the expected benefits and concerns of the new Building safety Act 2022 respectively. Therefore, unique naming was given by linking each cluster to the specific area of benefit and concern from respective groups.

4. Analysis and results

4.1. Sentiment polarity assessment

The analysis of public opinions towards the BSA 2022 revealed varying degrees of sentiments within each polarity group. 76% of the sentences are classified as neutral, while 20% of the sentences are classified as positive, and 4% of the sentences are classified as negative. The high percentage of neutral statements is not surprising, as the dataset classed was from webinars and conferences, mostly seeking to provide clarity and educate people on the new BSA. For example, statement like "*The scope is for all high-risk residential buildings, defined as over six stories high with more than two residential units, care homes, and hospitals*", which has been classified as neutral, does not indicate positive or negative sentiment, but highlights the scope of the BSA 2022. Another example is the statement "*We are much further behind than we would like to be in terms of preparedness for the golden thread*". This statement also does not lean towards a positive or negative sentiment about the Act but an expression of the status of the implementation of the Act. Unsurprisingly, the recentness of the subject matter requires awareness and highlights, which results in much of the dataset being neutral. However, the majority of the remaining results indicate a positive reaction from the public towards the Building Safety Act 2022. The overall outcome of the sentiment analysis, showing the sentiment polarity, is captured in Fig. 2.

Subsequently, the mean sentiment scores for negative, neutral, and positive polarity groups were calculated to identify the sub-polarity level from very positive to very negative. The mean sentiment scores were found to be −0.673 for negative, 0.000 for neutral, and 0.703 for positive. Based on these values, conventional limits were established to categorise comments into sub-polarity groups. Comments with average sentiment scores below −0.673 were classified as very negative, those between −0.673 and 0.000 as negative, 0.000 as neutral, between 0.000 and 0.703 as positive, and above 0.703 as very positive. In Fig. 3, it was observed that the majority (76 %) of comments expressed neutral sentiments towards the Building Safety Act 2022, 9 % were very positive, 11 % were positive, 2 % were negative, and the remaining 2 % were very negative.

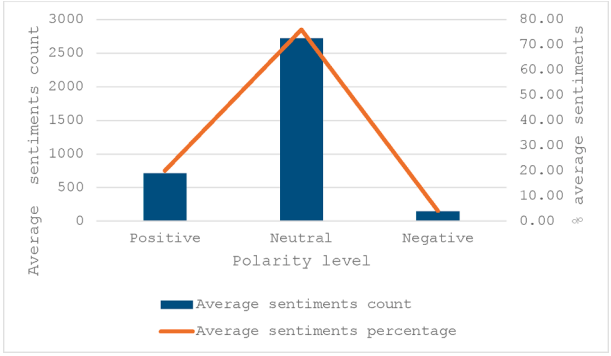


Fig. 2. Polarity levels of YouTube data on BSA 2022 (Source: Authors).

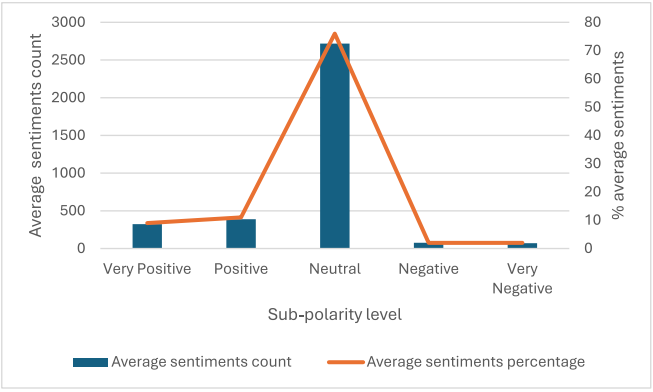


Fig. 3. Sub-polarity levels of YouTube data on BSA 2022 (Source: Authors).

4.2. K-Means clustering

The result of the manual approach for identifying the various clusters in the dataset yielded ten clusters. After adopting the elbow method k-means to validate the manual approach, the results revealed nine as the optimal number of clusters. This is because the distance from point 9 to 10 was the shortest, with a value of 0.654 (Fig. 4), in line with Saji (2024). The study employed the nine clusters as it corroborates the manual exercise. The overall outcome of the elbow method k-means clustering process is shown in Fig. 4.

4.3. Topics allocation

The LDA analysis process resulted in 110 terms following the elimination of terms with a sparsity exceeding 0.980%; each term was associated with a specific topic for the positive sentiments. For the negative sentiments, 171 terms were obtained. Additionally, beta values were allocated to each term, indicating that a higher beta value corresponds to a greater likelihood of the term appearing in a document. Four of the authors independently analysed the sentiments assigned to each cluster using the topics to come up with the appropriate name for the clusters. The clusters are discussed in the next section.

5. Discussions

The model result from the Latent Dirichlet Allocation analysis grouped the terms into nine topic clusters for both positive and negative sentiments. The positive sentiments returned the following clusters that are deemed to be expected benefits of BSA 2022: (1) Enhancing Safety Assurance, (2) Enhancing Competence and Accountability in Building Safety, (3) Addressing Challenges and Promoting Innovation in Building Safety Compliance, (4) Facilitating Collaboration through Clarity of Responsibility, (5) Engagement and Enhancing Industry Leadership, (6) Promoting Industry Advocacy, Reward and Recommendations, (7) Promoting Integration and Compliance to Building Regulations, (8) Promoting Inclusion and Professionalism, and (9) Continuous Improvement, Best Practices and Future Directions. The negative sentiments, on the other hand, yielded the following topic that expressed concerns over the new BSA 2022: (1) Concerns for Fragmented Approach to Safety, (2) Challenges and Scepticism in Regulatory Compliance and Legal Liabilities, (3) Increased Documentation and Liability Issues, (4) Stringent Criminal Persecution and Building Safety Defects, (5) Tragedy Syndrome and public Fear, (6) Resource Requirements Concerns, (7) Data Management Concerns, (8) Risk Management Concerns, and (9) Compliance Process Efficiency Concerns.

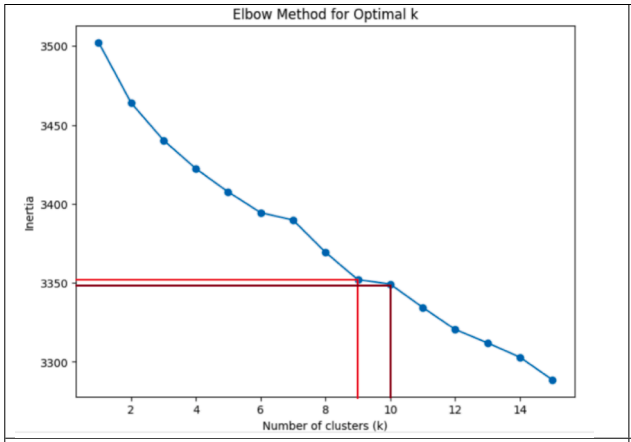
5.1. Positive sentiments topic clusters

5.1.1. Enhancing safety assurance

The need for a proactive building safety cannot be overemphasised (Hackitt, 2018; Shad et al., 2021). This led to the recommendation for a radical overhaul of the existing regulatory system to make the regulations fit for purpose, ensuring safety assurance. The finding of this study suggests that the establishment of the Building Safety Act 2022 demonstrates an enhanced safety assurance. This is in line with the earlier findings of Mohamed et al. (2019) that imposing strict regulation, highlighting the legal requirements of each stakeholder as stipulated in the new BSA, will assure overall building safety, including building residents. For example, the comment "*They are really I think setting the standard for what good resident engagement looks like, getting ahead of the curve not waiting to be told what to do but actually really understanding what residents need and there is some really good practice there*", with a positive sentiment of 0.840, indicates how building safety is assured through residents' engagement. Another example is the comment with a positive sentiment of 0.649, stating that "*The BSA encourages both clients and contractors to engage in early discussions to align their expectations and capabilities*", points out how the Building Safety Act 2022 encourages early efforts towards ensuring enhanced building safety.

5.1.2. Enhancing competence and accountability in building safety

One of the major issues bedevilling building safety is the issue of those involved in fire safety to understand and interpret the regulations and guidelines to ensure adequate enforcement and quality assurance



(a) K-Mean clustering

```
-30.37390661509579 0
4.2984322103847035 1
3.7048871966534875 2
2.497507498941104 3
1.5574671503179616 4
1.9472431143404378 5
1.4451666181149392 6
2.739799648507443 7
2.1151350752735425 8
0.6539988549774591 9
2.2295927461574934 10
1.7931854381234587 11
0.9162222933525754 12
3.9459347968428347 13
0.5293339731083506 14
```

(b) Distance between points

Fig. 4. Elbow method k-means clustering (Source: Authors).

(Hackitt, 2018). This leads to the competences and accountability of those involved being in question. The Building Safety Act 2022 addresses some of those challenges by ensuring competency and requirements are met to promote accountability in ensuring fire safety. One of the comments with a positive sentiment of 0.751 shows the public's confidence in the Building Safety Act 2022 to improve implementation, as it reads "*This will also allow principal designers and hopefully the Building Safety Regulator to judge whether our members have those competencies*". Another comment indicating the public's satisfaction with the Building Safety Act 2022 towards enhancing competencies and accountability is "*It does bring new accountability and stronger duties, new competence requirements, a greater voice to residents.*", which has a positive sentiment of 0.625. These findings indicate BSA 2022 will lead to improvement in the competency knowledge among professionals as posited by Mohamed et al. (2019).

5.1.3. Addressing challenges and promoting innovation in building safety compliance

As pointed out by previous studies (Hackitt, 2018; Shad et al., 2021), there are numerous issues challenging the achievement of effective building safety. The public's sentiments in this topic cluster highlight some of those issues as they relate to the BSA (2022). An example is the comment with a positive sentiment of 0.822 which states that "*I should say our concern is more to do with risk aversion and an unwillingness to engage with this process in terms of coming up with new and better solutions in this space and we think there's a real opportunity to get insurers to be more proactive rather than sitting back and waiting for others to offer those solutions*". This issue can be attributed to the attitudes and behaviours of individuals regarding fire safety (Glauberman, 2018; Ramachandran, 1999; Zmud, 2008; Ajayi et al., 2022). Another example is the comment, "*If we can collaborate and get the main players in the sector to collaborate, to come up with the best practice, which we know that the regulator will rely upon, then everybody's on the same playing field*", which has a positive sentiment of 0.718. This comment further stresses the attitude of the public.

5.1.4. Facilitating collaboration through clarity of responsibility

Hackitt (2018) report outlines the lack of an effective audit trail in the fire safety approach. This is largely attributable to the lack of clear responsibilities in the existing safety approach. To address this, the Building Safety Act 2022 focuses on assigning responsibilities to individuals to ensure a collaborative approach to building safety. The data suggests that there is an improvement in this regard. For example, the comment "*Many of you are aware that one of the other key aspects of the whole legislation is the introduction of competent building safety managers*", with a positive sentiment of 0.625 shows the public's satisfaction with the assignment of responsibilities. Another example is "*A Building Safety Regulator is being set up and there'll be something like 700 people in there who will oversee the entire building control regime*", which has a positive sentiment of 0.649. This supports the earlier recommendations put forward by Hackitt (2018) and Mohamed et al. (2019).

5.1.5. Engagement and enhancing industry leadership

This topic cluster analyses the data from the public's sentiments on the commitments from the government and organisations to take charge of implementing the BSA 2022. The policies can only be successfully implemented through effective leadership from the government and industry organisations. The sentiment of the public judging from the comments "*We are keen to ensure that there is a consistent approach to the regulation and oversight of building safety across the built environment*" and "*HSE produced an overview document to gateways two and three, which is more interesting and a better read than the regulations themselves*" with respective positive sentiments of 0.785 and 0.709 are pointing towards collective efforts to improve the use of the BSA 2022. This is in line with the findings of Shad et al. (2021), indicating the need for improved government commitment.

5.1.6. Promoting industry advocacy, reward and recommendations

The initial response to the new Building Safety Act 2022 indicates the consensus on the potential of the Act to improve building safety, however, its success depends on how well it is implemented. This is because previous efforts are not showing a lack of regulatory guides, but a lack of proper implementation (Hackitt, 2018; Shad et al., 2021). The results from the study indicate the potential for promoting the implementation of the Building Safety Act 2022 through industry advocacy, rewarding good practices and recommendations for efficiency. For example, the comment "*I think actually for lots of organizations, if you go through it, you may find if you've got good management systems in place at the moment, a lot of those elements will be covered*" with a positive sentiment of 0.593 indicates industry advocacy from organisations. Another example is "*We've got a great focus on trying to make sure that the individuals involved are actually themselves competent, irrespective of where they're working*", which has a positive sentiment of 0.827, indicating that implementation is being facilitated by improving advocacy for the development of individuals and the industry.

5.1.7. Promoting integration and compliance to building regulations

The major casualties from fire incidents are occupants of high-rise residential buildings (Vu and Lin, 2024; Wang et al., 2024). This happens to be the centre of attention for the BSA 2022. The perception of the public is that the lives of residents and the properties will be safer by complying with the Building Safety Act 2022. An example is in the comment "*As I'm sure you're all familiar with by now, the purpose of the Building Safety Act is to ensure the safety of people in and about buildings and improve the standards of those buildings*" with a positive sentiment of 0.910. Another example is "*So, those transitional provisions are actually, before we get there, this is just a hopefully a helpful summary slide which shows now the buildings that are regulated by the regulator and by the Building Safety Act, both during construction and occupation*", which has a positive sentiment of 0.810, indicating enhanced safety of occupants will be achieved through Building Safety Act 2022 compliance throughout the building lifecycle.

5.1.8. Promoting inclusion and professionalism

As pointed out by Shad et al. (2021), analyses of various fire safety-related documents indicate a reasonable level of safety for residential buildings. This success can only be recorded through professionalism in working with all relevant safety documents. The data from this study suggests that the Building Safety Act 2022 must leverage other existing documents for its effective implementation. For example, the comment, "*ISO 19,650 is a fantastic way to start becoming golden thread compliant*", with a positive sentiment of 0.557, shows the confidence of the public in the Building Safety Act 2022 in being implemented along with other documents. Another example is "*The provision of EWS-1 forms has proved successful in creating clear and consistent documentation in respect of cladding on multi-story domestic buildings.*".

5.1.9. Continuous improvement, best practices and future directions

The future of the Building Safety Act 2022 depends on continuous improvement, and achieving best practices. According to the data, there is great promise for the BSA 2022 in digitalisation. For example, the comments "*The digitalization and the ease of use that you talked about has led to remarkable adoption from all clients*", having a positive sentiment of 0.727 and "*Ensuring all information is kept electronically and transferred securely may present technical and logistical challenges*", with a positive sentiment of 0.586, indicate how digitalisation will improve the implementation of Building Safety Act 2022. Another example is the comment "*We've seen the Construction Leadership Council through its Challenge Panel really driving a much higher level of ambition and supporting that delivery of safe high-quality buildings*", which has a positive sentiment of 0.727 indicating a brighter future for Building Safety Act 2022 success geared towards continuous improvement, and achieving best practices.

5.2. Negative sentiments topic clusters

5.2.1. Concerns for fragmented approach to safety

This topic cluster shows concerns for a fragmented approach to building safety. This issue can be seen as the data suggests that the public feels the purpose of the Building Safety Act 2022 does not capture strategies to prevent fire in detail. This is indicated in the comment "*We need fire strategies, fire risk assessments, training, tests, and drills to prevent fires*", which has a negative sentiment of −0.700. Another comment shows the public's concern about how the Building Safety Act 2022 will not benefit smaller projects. This is captured in the comment with a negative sentiment of −0.735, "*If things go horribly wrong in smaller projects, it could still be local authority building control that looks at that*". These concerns from the public highlight the fragmentation in policies contained in the Building Safety Act 2022. This fragmentation could result in uncertain responsibilities as highlighted by Simpson (2018).

5.2.2. Challenges and scepticism in regulatory compliance and legal liabilities

Some issues highlighted by Hackitt (2018) to be affecting building safety is the ability of those involved in ensuring fire safety to understand and interpret the regulations and guidelines, and comply with the regulations. This results in several challenges, including legal liabilities (Mohamed et al., 2019). The public is showing sentiments tilting towards the lack of trust in compliance with requirements in regulations, as indicated by the comment with a negative sentiment of −0.511, stating "*Initially, about 75% of submissions to Gateway One were being rejected*". Another example is the comment with a negative sentiment of −0.700, which states "*Claims in tort, well, if the building in question is merely defective, the law says that those defects are an economic loss rather than physical damage, and as such, it's unlikely that any common law duty of care will be owed*".

5.2.3. Increased documentation and liability issues

As pointed out by previous studies (Hackitt, 2018; Shad et al., 2021), numerous issues are challenging the achievement of effective building safety. Some of these issues relate to the documentation, leading to increased liabilities. The public's sentiments in this topic cluster highlight some of those issues. For example, the comment with a negative sentiment of −0.637, which states that "*In some cases, it may be felt that the period of time that you're now being expected to hold on to documentation digitally or otherwise is quite unfair*" shows the public's concern on the availability of experts to carry out the policies contained in the BSA 2022. A lack of available experts can result in increased liabilities. Another example is the comment is the comment "*In some cases, it may be felt that the period of time that you're now being expected to hold on to documentation digitally or otherwise is quite unfair*". The comment has a negative sentiment of −0.526, and it indicates the public's fear of the readiness to retain data.

5.2.4. Stringent criminal persecution and building safety defects

The data indicates fear from the public on the policies for prosecuting offenders. For example, "*We now have criminal offenses if you breach building regulations and also for providing false or misleading information to the regulator, which I think is easier to breach because it can be quite easy to provide misleading information as the PAP when you are relying on other people to provide that information, whether that's APs, consultants, contractors*", a comment with a negative sentiment of −0.649 indicates the public's fear of misleading the responsible persons. Another example is "*Failing to acknowledge limitations or asking for assistance can result in non-compliant work*" with a negative sentiment of −0.511, which points out the fear of the public on the limitations and lack of adequate guidance for responsible persons.

5.2.5. Tragedy syndrome and public fear

The public is still terrified by the Grenfell tragedy. This results in their lack of trust in the Building Safety Act 2022 and how it regulates fire safety. This can be seen in some of the comments like, "*The Grenfell Tower tragedy of June 2017 led to the dreadful realization that many residential buildings throughout the UK had cladding that may promote fire spread*" with a negative sentiment of −0.796 indicate the fear the materials choice of building will still result in fire spread irrespective of the policies. Another example is "*The Grenfell health and safety manager, during her testimony, repeatedly described how the recommendations of the fire risk assessor would not be addressed for years at a time, even when the London Fire Brigade imposed enforcement orders*" with a negative sentiment of −0.527 expresses concern on how the recommendations on fire safety cannot be implemented in many years. This is in agreement with the findings of Mohamed et al. (2019), who found that some members of the public were reluctant to believe in the industry taking a proactive approach to building safety after the Grenfell fire.

5.2.6. Resource requirements concerns

The efficacy of enhancing building safety through the Building Safety Act 2022 is contingent upon the effectiveness of its execution, as evidenced in the submissions of Hackitt (2018) and Shad et al. (2021). Previous endeavours have not been hindered by a deficiency in regulatory frameworks, but rather by inadequate implementation strategies (Hackitt, 2018; Shad et al., 2021). These have raised concerns about the resources required for implementing the Building Safety Act 2022. For example, in the comment "*Or am I spending too much time and money and effort here when the risk here is extremely low?*", with a negative sentiment of −0.541, the public is questioning whether the high cost of implementation is worth implementing. The comment "*At the point of practical completion, the developer in this case had suffered actionable damage*", with a negative sentiment of −0.751, shows the concerns of the public about how developers can suffer damages.

5.2.7. Data management concerns

Poor management of information, especially from previous projects, has been pointed out as the major fear of the public. This is highlighted in some of the comments with negative sentiments. For example, the comment "*Bad information management was identified as being at the root of many problems that exacerbated the Grenfell disaster.*", with a negative sentiment of −0.833 points to the issue of proper information management being responsible for the escalation of the Grenfell disaster. Another comment, "*Many defective building claims arise in relation to work done many years ago, which have perhaps come to light through investigations post-Grenfell, and those claims are necessarily going to have limitation problems*", with a negative sentiment of −0.778, indicates concerns relating to poor information management.

5.2.8. Risk management concerns

As pointed out by Shad et al. (2021), analyses of various fire safety-related documents indicate a reasonable level of safety for residential buildings. Also, the Building Safety Act 2022 is based on previous safety documents. On the contrary, some concerns are raised regarding the BSA promise, especially as it relates to risk management. For example, the comment "*Within the BSR HSC we don't see enforcement as a last resort when other methods have failed*", having a negative sentiment of −0.511 shows the fear of the public on the Building Safety Act 2022 being based on previous failed efforts. This is further supported by the comment "*The current methods and practices of building buildings lead to an awful lot of waste and rework*", with a negative sentiment of −0.700.

5.2.9. Compliance process efficiency concerns

The future of Building Safety Act 2022 depends on several factors. According to the data, there is great promise for Building Safety Act 2022 in digitalisation. On the other hand, some fears are indicated that if the BSA 2022 fails, then it will result in issues in the future. This is stressed in the comment with a negative sentiment of −0.710, stating "*In the past, the wrong product was often selected, leading to a lot of waste*".

These fears relate to failure to comply with regulations, resulting in a lack of process efficiency.

6. Conclusion

Current efforts in the domain of building safety have been identified to be faulty, largely attributable to the use of traditional approaches. Additionally, the existing methods have shown limited ability to capture the full spectrum of the public. Furthermore, current literature seems to overlook the concerns of the broader population about the regulations guiding building safety. This study, therefore, applies a novel approach to provide a thorough analysis of the opinions, concerns, and needs of construction professionals regarding the Building Safety Act 2022 using social media data, specifically, YouTube data. A total of 3577 data points reflecting the general public's views were gathered, processed, and examined using VADER for sentiment analysis, k-means clustering and LDA text mining techniques for topic modelling.

The findings revealed that the public expressed positive sentiments (20 %), negative sentiments (4 %), and neutral sentiments (76 %) towards the Building Safety Act 2022. The high neutral sentiments are attributed to the nature of the data analysed, which are training and webinars providing training and awareness of the act. The k-means clustering analysis validated the use of nine clusters. Subsequently, LDA was employed to categorise the comments into nine positive topic areas: Enhancing Safety Assurance; Enhancing Competence and Accountability in Building Safety; Addressing Challenges and Promoting Innovation in Building Safety Compliance; Facilitating Collaboration through Clarity of Responsibility; Engagement and Enhancing Industry Leadership; Promoting Industry Advocacy, Reward and Recommendations; Promoting Integration and Compliance to Building Regulations; Promoting Inclusion and Professionalism; and Continuous Improvement, Best Practices and Future Directions. For the negative sentiments, the LDA yielded topic clusters including Concerns for Fragmented Approach to Safety; Challenges and Scepticism in Regulatory Compliance and Legal Liabilities; Increased Documentation and Liability Issues; Stringent Criminal Persecution and Building Safety Defects; Tragedy Syndrome and Public Fear; Resource Requirements Concerns; Data Management Concerns; Risk Management Concerns; and Compliance Process Efficiency Concerns. The findings of this study show that the public is confident with the purpose and benefits of the Building Safety Act 2022 for regulating building safety. The public is also happy with the attention the Building Safety Act (2022) is giving to competencies and requirements to ensure efficient building safety. The results also show government and organisational commitments towards improving building safety through leadership and by fast-tracking the BSA 2022 implementation. Lastly, the study shows a good reception on the focus of the Building Safety Act 2022 on residential buildings and its scope to cut across the building lifecycle.

The research findings have significant theoretical and practical implications for advancing the Building Safety Act 2022 for improved building safety. The study evaluates a range of diverse city-scale population attitudes towards the BSA 2022 and uncovers the opinions of the public. It delves into professionals' perceptions of the new Building Safety Act 2022) within the context of the UK, offering a foundation for future studies on public sentiments towards new products, policies or services. In practical terms, policymakers can utilise these findings to tailor interventions that align with public preferences and promote building safety. Various stakeholders, such as building safety managers, building safety regulators, suppliers of materials and equipment, planning and design professionals, and contractors, will gain insights into the public's needs and opinions regarding building safety, enabling them to provide appropriate technical standards and services. However, there are some concerns on fragmented safety approach, claims from older projects due to poor documentation, limitations of the public, overburdening the public, high cost of implementation, as well as uncertainties and the possibility of the Building Safety Act 2022 to fail just like previous regulations.

Despite the numerous advantages of this research for both research and practical applications, it is important to acknowledge the limitations. Firstly, while the study has enhanced our understanding of attitudes towards Building Safety Act 2022 in the UK, caution is necessary when applying the results to a different context. Additionally, the study's restriction to data from YouTube represents a significant limitation. Therefore, future research should expand the scope to include other social media platforms such as X, Reddit, and Facebook in order to validate and gain further insights into public attitudes towards the Building Safety Act 2022. Furthermore, given the scarcity of research on standardised tools for evaluating YouTube and other social media as a data source for research in the built environment sector, it would be beneficial for future studies to focus on developing, validating, and testing assessment tools in this area to enrich research within the sector.

7. Recommendations

This study draws insights from the perceptions of the construction professionals on the BSA and offers solid proof for policymakers and relevant stakeholders on the necessity of the BSA to advance building safety implementation globally. These insights leverage the positive and negative of the general public on the Building Safety Act 2022 to propose recommendations for policy and implementation to hasten the adoption of efficient building safety, enhance governments' safety objectives, and furnish residents with safer and more comfortable living spaces. It is important to recognise that while "local context" is crucial in crafting building safety policy frameworks, a comprehensive compilation of various sentiments from a larger population can assist in policy formulation across any country or jurisdiction. Furthermore, it is advantageous for overall building safety promotion strategies.

- The necessity for the government and other organisations to improve their promotional efforts by providing practical and professional knowledge to increase public awareness and understanding of building safety regulations has been highlighted in previous studies (Hackitt, 2018; Shad et al., 2021). Shad et al. (2021) stressed the significance of creating educational resources to effectively manage and communicate the benefits and relevance of building safety legislation to the public. This can be accomplished through the dissemination of informative materials that emphasise the broader advantages of complying with the Building Safety Act 2022. Furthermore, government agencies and organisations advocating for fire safety awareness and solutions should establish platforms and websites that contain relevant information to showcase successful projects on building safety, share pertinent research findings, and provide centralised high-level supported awareness training programs. This will help promote competency, improve collaboration, as well as knowledge and awareness.
- Also, there is an issue of adequately enforcing regulations by assigning roles and responsibilities to competent persons (Hackitt, 2018). These issues include misinforming building safety regulators, as well as rejection of submissions, which could be attributed to a lack of competence by those who prepared the submission. The government, along with organisations, should organise trainings and workshops for professionals to improve their competencies. The trainings and workshops should also include the supply chain to improve materials quality to enhance building safety.
- Additionally, attitudes and behaviours of building users have been found to affect their fire safety practices (Glauberman, 2018; Ramachandran, 1999; Zmud, 2008). The current policies should be extended to capture the attitudes and behaviours of building users. Public agencies and industry-led organisations should also organise workshop trainings for residential building users in high-rise buildings to improve their awareness of the Building Safety Act 2022, as well as their fire safety practices. This is necessary as the

enforcement of the regulations by the residential building users in high-rise buildings is greatly affected by their attitudes and behaviours.

- Finally, it has been observed that the expenses associated with the Building Safety Act 2022 implementation can hinder its success. This is noteworthy especially when the cost of retrofitting existing buildings to suit the requirements contained in the Building Safety Act 2022 are considered. Consequently, there is a need for governmental intervention to revamp financial incentive schemes, to encourage and assist a larger number of individuals to contemplate enhancing the fire safety efficiency of their residences.

Funding Source

This project is funded by Innovate UK (Project ID: P33796).

CRediT authorship contribution statement

Muhammad A. Yamusa: Writing – original draft, Methodology, Data curation, Conceptualization. **Jamiu A. Dauda:** Writing – original draft, Validation, Supervision, Project administration, Methodology, Funding acquisition, Conceptualization. **Zainab T. Jagun:** Writing – review & editing, Supervision. **Abdullahi B. Saka:** Writing – review & editing, Conceptualization. **Ramith Rajan:** Visualization, Software, Methodology, Data curation. **Adekunle S. Oyegoke:** Writing – review & editing, Supervision. **Saheed O. Ajayi:** Writing – review & editing, Supervision, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

This paper is part of a larger research project funded by Innovate UK, United Kingdom (Project ID: P33796). The project involves the development of an advanced AI-based Intelligent Golden Thread System for Building Safety Management (i-GBSM). Papers may be published in other sources which may share similar background. However, the works will have different scope, objectives, and findings.

Data availability

Data will be made available on request.

References

Abdullahi, B., Ibrahim, Y.M., Ibrahim, A.D., Bala, K., Ibrahim, Y., Yamusa, M.A., 2024a. Development of machine learning models for categorisation of Nigerian Government's procurement spending to UNSPSC procurement taxonomy. Int. J. Procurement Manage. 19 (1), 106–121. https://doi.org/10.1504/IJPM.2024.135175.

Abdullahi, B., Ibrahim, Y.M., Ibrahim, A.D., Bala, K., Ibrahim, Y., Yamusa, M.A., 2024b. Development of machine learning models for classification of tenders based on UNSPSC standard procurement taxonomy. Int. J. Procurement Manage. 19 (4), 445–472. https://doi.org/10.1504/IJPM.2024.137329.

Ajayi, S.O., Lister, N., Dauda, J.A., Oyegoke, A., Alaka, H., 2022. Influencing subcontracted operatives' attitudes and behaviours towards improved health and safety culture in construction. Eng. Constr. Archit. Manag. https://doi.org/10.1108/ECAM-03-2022-0265. Vol. ahead-of-print No. ahead-of-print.

Azer, S.A., 2020. Are DISCERN and JAMA Suitable Instruments for Assessing YouTube Videos on Thyroid Cancer? Methodological Concerns. J. Cancer Educ. 35 (6), 1267–1277. https://doi.org/10.1007/s13187-020-01763-9.

Billington, M. J., Ferguson, A., & Copping, A. G. (2002). Means of Escape from Fire (1st ed.). Wiley. doi: 10.1002/9780470758458.

Blei, D.M., 2012. Probabilistic topic models. Commun. ACM 55 (4), 77–84. https://doi.org/10.1145/2133806.2133826.

British Standards Institute. (2019). Application of fire safety engineering principles to the design of buildings: Human factors: Life safety strategies—Occupant evacuation, behaviour and condition (Sub-system 6). British Standards Institute, London, United Kingdom. 978-0-580 98320-7.

Building Safety Act. (2022). King's Printer of Acts of Parliament. https://www.legislation.gov.uk/en/ukpga/2022/30/contents.

Cassidy, J.T., Baker, J.F., 2016. Orthopaedic Patient Information on the World Wide Web: An Essential Review. J. Bone Joint Surg. 98 (4), 325–338. https://doi.org/10.2106/JBJS.N.01189.

Charnock, D., 1998. The DISCERN handbook. Quality Criteria Consumer Health Informat. Treatment Choices. 7–51.

Cleef, L., Yang, M., Bouchaut, B., Reniers, G., 2024. Fire risk assessment tools for the built environment—An explorative study through a developers' survey. Fire Saf. J. 146, 104169. https://doi.org/10.1016/j.firesaf.2024.104169.

Creswell, J.W., Creswell, J.D., 2023. Research design : qualitative, quantitative, and mixed methods approaches, sixth ed. SAGE Publications Inc., Thousand Oaks, California.

Dadvar, M., Hauff, C., de Jong, F.M.G., 2011. Scope of negation detection in sentiment analysis. Proceedings of the Dutch-Belgian Information Retrieval Workshop, DIR 2011, 16–20. https://research.utwente.nl/en/publications/scope-of-negation-detection-in-sentiment-analysis.

Dauda, J.A., Ajayi, S., Omotayo, T., Oladiran, O.O., Ilori, O.M., 2024. Implementation of lean for small- and medium-sized construction organisational improvement. Smart Sustainable Built Environ. 13 (3), 496–511. https://doi.org/10.1108/SASBE-10-2022-0233).

Dauda, Jamiu and Tutt, Amelia and Ajayi, Saheed and Adebisi, Waris and Saka, Abdullahi B. and Oladiran, Olayiwola and Oyegoke, Adekunle S. and Jagun, Zainab T. (2024a), Data-Driven Analysis of Barriers to Net Zero Practises in the UK Construction Sector: A Multidisciplinary Approach Using Clustering and Topic Modelling (September 04, 2024). Available at SSRN: https://ssrn.com/abstract=4979358 or https://doi.org/10.2139/ssrn.4979358.

Dauda, J. A, Chavan, N. N, Saka, A, Ajayi, S and Oyegoke, A (2024b) An appraisal of barriers to digitalisation of construction industry in developing countries: perspective from India. International Journal of Construction Mgt. pp. 1-13. ISSN 1562-3599 DOI: doi: 10.1080/15623599.2024.2362014.

Dean, B. (2024). Youtube Stats: How many people use YouTube in 2022? https://backlinko.com/youtube-users.

Fitzgerald, A., Hackling, M., Dawson, V., 2013. Through the viewfinder: reflecting on the collection and analysis of classroom video data. Int. J. Qual. Methods 12 (1), 52–64. https://doi.org/10.1177/160940691301200127 (Original work published 2013).

Giang, H.A., 2021. High-rise buildings and the matters of fire safety. J. Build. Sci. Technol. 1. https://www.ibst.vn/upload/documents/file_upload/1633578285Hoang-Anh-Giang.pdf.

Glauberman, G. H. (2018). Factors Influencing Fire Safety and Evacuation Preparedness Among Residential High-Rise Building Occupants. Unpublished PhD Thesis Submitted to the University of Hawaii.

Grun, B., Hornik, K., 2011. topicmodels: An R Package for Fitting Topic Models. J. Stat. Softw. 40 (13), 1–30.

Guler, M.A., Aydın, E.O., 2022. Development and validation of a tool for evaluating YouTube-based medical videos. Irish J. Med. Sci. (1971 -) 191 (5), 1985–1990. https://doi.org/10.1007/s11845-021-02864-0.

Hackitt, J., D. (2018). Building a Safer Future—Independent Review of Building Regulations and Fire Safety: Final Report (CCS1117446840).

Hall, J. R. (2013). High-Rise Building Fires.

Holland, C., Crowder, D. D., & Shipp, M. (2016). External Fire Spread – Part 1 Background research.

Hostetter, H., Naser, M.Z., Randall, K., Murray-Tuite, P., 2024. Evacuation preparedness and intellectual disability: Insights from a university fire drill. J. Build. Eng. 84, 108578. https://doi.org/10.1016/j.jobe.2024.108578.

Hutto, C. J. (2021). VaderSentiment's documentation [Computer software]. https://vadersentiment.readthedocs.io/en/latest/.

Ikotun, A.M., Ezugwu, A.E., Abualigah, L., Abuhaija, B., Heming, J., 2023. K-means clustering algorithms: A comprehensive review, variants analysis, and advances in the era of big data. Inf. Sci. 622, 178–210. https://doi.org/10.1016/j.ins.2022.11.139.

Jiang, H., Qiang, M., Lin, P., 2016. Assessment of online public opinions on large infrastructure projects: A case study of the Three Gorges Project in China. Environ. Impact Assess. Rev. 61, 38–51. https://doi.org/10.1016/j.eiar.2016.06.004.

Kuligowski, E.D., 2011. Terror Defeated: Occupant Sensemaking, Decision-Making and Protective Action in the 2001 World Trade Center Disaster [PhD]. University of Colorado.

Kuo, T.-W., Lin, C.-Y., Chuang, Y.-J., Hsiao, G.-L.-K., 2022. Using Smartphones for Indoor Fire Evacuation. Int. J. Environ. Res. Public Health 19 (10), 6061. https://doi.org/10.3390/ijerph19106061.

Liu, X., Zhang, H., Zhu, Q., 2012. Factor Analysis of High-Rise Building Fires Reasons and Fire Protection Measures. Procedia Eng. 45, 643–648. https://doi.org/10.1016/j.proeng.2012.08.216.

Mohamed, I.F., Edwards, D.J., Mateo-Garcia, M., Costin, G., Thwala, W.D.D., 2019. An investigation into the construction industry's view on fire prevention in high-rise buildings post Grenfell. Int. J. Build. Pathol. Adaptat. 38 (3), 451–471. https://doi.org/10.1108/IJBPA-05-2019-0048.

National Fire Protection Association (NFPA), 2011. NFPA 101: Life Safety Code, 2012th ed. National Fire Protection Association, MA, Quincy, United States.

Nimlyat, P.S., Audu, A.U., Ola-Adisa, E.O., Gwatau, D., 2017. An evaluation of fire safety measures in high-rise buildings in Nigeria. Sustain. Cities Soc. 35, 774–785. https://doi.org/10.1016/j.scs.2017.08.035.

Pérez-Urrestarazu, L., Fernández-Cañero, R., Franco-Salas, A., Egea, G., 2015. Vertical Greening Systems and Sustainable Cities. J. Urban Technol. 22 (4), 65–85. https://doi.org/10.1080/10630732.2015.1073900.

Proulx, G., 1995. Evacuation time and movement in apartment buildings. Fire Saf. J. 24 (3), 229–246. https://doi.org/10.1016/0379-7112(95)00023-M.

Ramachandran, G., 1999. Fire safety management and risk assessment. Facilities 17 (9/10), 363–377. https://doi.org/10.1108/02632779910278782.

Ronchi, E., Nilsson, D., 2013. Fire evacuation in high-rise buildings: A review of human behaviour and modelling research. Fire Sci. Rev. 2 (1), 7. https://doi.org/10.1186/2193-0414-2-7.

Saji, B. (2024, July 1). Elbow Method for Optimal Cluster Number in K-Means. https://www.analyticsvidhya.com/blog/2021/01/in-depth-intuition-of-k-means-clustering-algorithm-in-machine-learning/#:~:text=The%20elbow%20method%20is%20a%20common%20technique%20used,their%20cluster%20centers%20%28WCSS%29%20will%20continue%20to%20decrease.

Sánchez-Rada, J.F., Iglesias, C.A., 2019. Social context in sentiment analysis: Formal definition, overview of current trends and framework for comparison. Inf. Fusion 52, 344–356. https://doi.org/10.1016/j.inffus.2019.05.003.

Shad, M. H., Rezgui, Y., Hodorog, A., & Petri, I. (2021). Digitalising Risk of Fire Resilience for UK buildings. 2021 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC), 1–11. doi: 10.1109/ICE/ITMC52061.2021.9570247.

Silberg, W.M., 1997. Assessing, Controlling, and Assuring the Quality of Medical Information on the Internet: Caveant Lector et Viewor—Let the Reader and Viewer Beware. JAMA 277 (15), 1244. https://doi.org/10.1001/jama.1997.03540390074039.

Simpson, J. (2018). Developer blames 'lack of government clarity' for delay replacing Grenfell-style cladding. www.insidehousing.co.uk/news/news/developer-blames-lack-of-government-clarity-for-delay-replacing-grenfell-style-cladding-59144.

Sui, W., Sui, A., Rhodes, R.E., 2022. What to watch: Practical considerations and strategies for using YouTube for research. Digital Health 8, 205520762211237. https://doi.org/10.1177/20552076221123707.

Szmuda, T., Syed, M.T., Singh, A., Ali, S., Özdemir, C., Słoniewski, P., 2020. YouTube as a source of patient information for Coronavirus Disease (COVID-19): A content-quality and audience engagement analysis. Rev. Med. Virol. 30 (5), e2132.

Tetteh, M.O., Boateng, E.B., Darko, A., Chan, A.P.C., 2023. What are the general public's needs, concerns and views about energy efficiency retrofitting of existing building stock? A sentiment analysis of social media data. Energ. Buildings 301, 113721. https://doi.org/10.1016/j.enbuild.2023.113721.

VandenBos, G., R. ,. (2006). APA Dictionary of Psychology.

Vu, M., Lin, S.-Y., 2024. Empirical assessment of fire safety in high-rise residential buildings in Vietnam and residents' knowledge and awareness regarding fire safety. Fire Saf. J. 146, 104162. https://doi.org/10.1016/j.firesaf.2024.104162.

Wang, Y., Zheng, R., Li, M., 2024. Risk assessment of fire safety in large-scale commercial and high-rise buildings based on intuitionistic fuzzy and social graph. J. Build. Eng. 89, 109165. https://doi.org/10.1016/j.jobe.2024.109165.

Wankhade, M., Rao, A.C.S., Kulkarni, C., 2022. A survey on sentiment analysis methods, applications, and challenges. Artif. Intell. Rev. 55 (7), 5731–5780. https://doi.org/10.1007/s10462-022-10144-1.

White, N., & Delichatsios, M. (2015). Fire Incident Case-Studies. In N. White & M. Delichatsios, Fire Hazards of Exterior Wall Assemblies Containing Combustible Components (pp. 25–48). Springer New York. doi: 10.1007/978-1-4939-2898-9_5.

Willem Menzemer, L., Marie Vad Karsten, M., Gwynne, S., Frederiksen, J., Ronchi, E., 2024. Fire evacuation training: Perceptions and attitudes of the general public. Saf. Sci. 174, 106471. https://doi.org/10.1016/j.ssci.2024.106471.

Wu, Z., Zhang, Y., Chen, Q., Wang, H., 2021. Attitude of Chinese public towards municipal solid waste sorting policy: A text mining study. Sci. Total Environ. 756, 142674. https://doi.org/10.1016/j.scitotenv.2020.142674.

Yoo, J.H., Kim, J., 2012. Obesity in the New Media: A Content Analysis of Obesity Videos on YouTube. HealthCommun. 27 (1), 86–97. https://doi.org/10.1080/10410236.2011.569003.

Zmud, M., 2008. Public Perceptions of High-rise Building Emergency Evacuation Preparedness. Fire Technol. 44 (4), 329–336. https://doi.org/10.1007/s10694-008-0057-5.