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Developing a Predictive Model of Crowd Behavior at Music Concerts and Festivals (MCF): A Proposal for a Research Framework

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Abstract: Music Concerts and Festivals (MCF) have experienced steady growth each year, transforming these events into large-scale international gatherings from their humble beginnings in the 1980s. The trend of increasing attendance by festival-goers and concert-goers at MCF has prominently emerged in the 21st century. The attendance of MCF contributes to the formation of crowds, which are indirectly influenced by risky behavior. Consequently, this trend has led to numerous incidents related to risky behavior at MCF. However, there is insufficient research on such behavior, and few existing studies address any predictive models specific to MCF. As a result, there has been a slight increase in aggressive behavioral incidents among festival-goers and concert-goers. This issue has demonstrated the importance of studying crowd behavior among those attending musical concerts and festivals. Therefore, this paper will focus on the important variables related to risky behavior that can cause crowd behavior and bridge the gap by identifying risky behavior among crowds. Additionally, this study will propose a research framework for the development of a crowd behavioral predictive model to anticipate future risk behavior among attendees. This research will employ a mixed-methods approach comprising qualitative and quantitative methodologies as its method of investigation. The research framework will then be used to develop a predictive model of crowd behavior among attendees of MCF that will help to provide significant information for event and concert organizers to understand potential risky behavior among the crowd, hence, help in mitigating or preventing unwanted crowd safety incidents at MCF.

Keywords: *Music concerts and festivals (MCF), Risky behavior, Predictive model, Crowd safety incidents*

1. Introduction and Background

Music Concerts and Festivals (MCF) are known as live music events performances (Webster et al., 2018; Frith, 2007), and these include, jazz music concerts, pop music concerts, rock music concerts, opera music concerts, electronic dance music (EDM), and all music festivals that held larger-scale live music events. Experts point out that live music events have always offered experience, connecting attendees to music uniquely—a tradition that has been alive since ancient times (Bennett, 2015). For example, the jazz music festival has become a trending event that has grown since the 20th century in Europe, where people began attending these events to experience live music and create lasting memories (Whyton, 2018). Moreover, previous studies have found that festival-goers and concert-goers who attend MCF events are mostly young (Carissa et al., 2020). Another researcher also revealed that these young people are involved in risky behavior (Hutton et al., 2021; Garga et al., 2021; Black et al., 2020; Feltmann et al., 2019; Milsten et al., 2017). Attendees represent the primary stakeholders who play an essential role in designing the success of MCF events (Raineri and Earl, 2005). Regrettably, attendees (festival-goers and concert-goers) at MCF are the main contributors to the occurrence of risks, particularly in risky behaviors that may lead to crowd behavior (Ismail et al., 2021). In other words, the crowd has been influenced by risky behaviors. Unfortunately, these issues have impacted the success of MCF, course to leading to incidents of crowd behavior at MCF.

The author found multiple evidence in the last years connected to crowd behavior incidents at MCF especially, at Malaysia. For example, a crowd behavior incident occurred at the Jiwa Kacau concert in Malaysia in June 2023, a sizable crowd engaged in a mosh-pit dance got out of control, leading to an incident of confrontation between security personnel and the crowd amid the artist's performance. Similarly, at Japan's annual five-day-long Rock in Japan Festival in August 2023, a tragedy occurred when four festival-goers broke their ribs while participating in the mosh-pit circle during the artist's performance, as reported by Shannon (2023).

Based on the above evidence, it is proved that the crowd is shaped by behavioral risks that may result in incidents at MCF. Experts have found that the growing situation of crowd behavior incidents in MCF presents a major obstacle to control safety and security at MCF. On the other hand, previous experts have shown significant interest in studying risk (Tangit et al., 2016; Cruwys et al., 2018), but there are still insufficient studies on risk behavior in MCF (Ismail et al., 2021). Consequently, this gap, leading to a lack of understanding by the organizers, is also notable. As stated by Raineri and Earl (2005) the minimal knowledge of risk behavior by the organizer has resulted in a lack of crowd safety and risk management at MCF. This contributed to unintentionally overlooking the occurrence of risk behavior at the event.

The purpose of this study is to address the existing gap by proposing a research framework for investigating crowd behavior at live music events, particularly among attendees at MCF. The objective of this proposal paper is to identify and understand risky behavior in these contexts. It is expected that a new predictive model of crowd behavior will be established by the end of this research study. The framework will provide valuable insights to assist event organizers in effectively preventing and managing risky behavior at MCF. Additionally, Zeitz et al. (2009) have argued that the term 'crowds' does not have a fixed meaning, as it can be used in various contexts. It can be concluded that crowd behaviors may vary depending on the context of the study. This multifaceted perspective emphasizes the importance of further exploration for better understanding and effective management of crowd behavior. Therefore, this study will adopt the term 'crowd behaviors' within the specific context of risk behavior among attendees at MCF.

2. Literature Review

Growth of MCF: Music concerts and festivals (MCF) were the main contributions to the construction of industry tourism, which has not only impacted the social but also the economic aspects of the community (Saragih & Amelia, 2020). Oxford Economics (2021) also mentioned in their report that concerts and live entertainment had a significant direct impact on the nationwide economy, amounting to $132.6 billion in 2019. The global music concert and festival market began to grow year by year in the 20th century.

In 1945, the Newport Jazz Festival, the first and foremost music festival, was held in Newport, Rhode Island. It had a significant impact, leading to the development of eras in modern music festivals. According to the Newport Historical Society (2021), 13,000 people attended this music festival. This tremendous success has indirectly made the place popular, leading people worldwide to recognize the town through this music festival, as reported by Belmore (2023).

With the rapid growth of music concerts and festivals worldwide in the 21st century, countries all around the world have begun hosting these events to enhance their tourism industry and contribute to their national economy. For example, Beyoncé's Renaissance 2023 tour has generated a revenue of $579 million upon completion of all scheduled (tour) performances, as reported by Kaufman (2023). The tour significantly enhanced the tourism industry in the host nations, particularly in Sweden. Beyoncé's Renaissance tour, marked by a 0.2% increase in inflation, led to a surge in hotel and ticket prices, both of which rapidly boosted economic activity in Sweden during May 2023 (Napolitano and Lee, 2023). Meanwhile, it was also reported that Taylor Swift's Era Tour surpassed the record revenue set by Beyoncé's Renaissance Tour in November 2023, accumulating a remarkable $1.04 billion revenue across 60 tour dates, as reported by Sherman (2023). According to Zetlin (2023), Taylor Swift's Era Tour had a huge impact and increased the economy in the USA.

Not to be forgotten, music concerts and festivals have been consistently hosted and grown by countries in Southeast Asia. For instance, after facing economic challenges during the COVID-19 pandemic in 2023, Vietnam took various initiatives to revive its economic activity. A case study by Phuong (2023) highlighted the Blackpink world tour concert in Hanoi as one such initiative to boost the economy. Fortunately, hosting the Blackpink world tour concert significantly contributed to Vietnam's economic growth, and the tourism industry experienced a rapid rise of 20% in mid-June (Phuong, 2023).

Meanwhile, in 2023, statistics indicate that Malaysia is projected to achieve a revenue of US$38.68 million in the music events market (Statisca, 2023). The development of music concerts and festivals (MCF) in Malaysia has provided a significant opportunity for the country to be recognized among international entertainment

music concerts and festivals hubs. According to Zikri et al. (2023), hosting a variety of music concerts and festivals, such as the Good Vibes Festival in Malaysia, has drawn concert-goers and festival-goers from around the world, especially in Southeast Asia. As a result, this festival has increased the demand for Malaysia's currency, cuisine, and hospitality, thereby indirectly contributing to the income of the tourism industry, as reported by Zikri et al. (2023).

Definitions of Crowd behaviors: Bon (2002) urged that crowd behavior is associated with risks for individuals in large gatherings, with some theories suggesting that individuals lose their sense of identity when they become part of the crowd. However, Al-Gadhi (1996), has defined that crowd behavior can be characterized as a temporary gathering of people who collectively respond to stimuli. Based on the Encyclopedia of Human Behavior, crowds are divided into two distinct types: psychological and physical crowds. Further expanded studies by Khazaie and Khan (2019), have offered a nuanced understanding of both psychological and physical crowds. It can be illustrated that physical crowds form when individuals converge unintentionally in a shared space, such as at airports or train stations, each bringing their unique perspectives. Theoretically, physical crowds are characterized by a group of people being present simultaneously in the same area (Riches, 2011). Conversely, psychological crowds emerge when individuals come together for a common purpose, such as attending a music festival like MCF, resulting in a shift from individual to collective identities as they perceive themselves as integral parts of the event community. This is to say, individuals in psychological crowds often adjust their personalities to better fit in with the crowd (Templeton et al., 2018).

As an illustration, risk behaviors tend to transition into manifestations of crowd behavior, indicating a propensity for individuals within crowds to engage in behaviors perceived as risky (Johnson et al., 1977). According to Alhajri et al. (2023), risk behavior manifests differently in various event contexts. For example, in the context of MCF, several notable risky behaviors have been identified and explored by previous researchers. Feltmann et al. (2019) demonstrated that elevated alcohol consumption at MCF events, results in high levels of intoxication. Further research by Feltmann et al. (2020) introduced a novel method aimed at prevention by suggesting improvements to the Alcohol Act at MCF events. However, research on alcohol-related risk behavior at MCF events remains limited, with this constraint persisting even in countries like Sweden, known for its high rate of alcohol use (Feltmann et al., 2019). Therefore, Feltmann et al. (2020) emphasize the detrimental impact of alcohol consumption on various health issues. Additionally, the authors mention that the increasing prevalence of this behavior at MCF can lead to crowd behavior such as violence, injuries, and sexual assault.

Sexual behavior, recognized as a type of risk behavior, has been noted to have the potential to escalate into crowd behavior at MCF. (Alhajri et al., 2023; Cameron Earl, 2008). Several researchers have further explained this particular topic of sexual behavior (Garga et al., 2021; Janssen et al., 2021; Bows et al., 2022; Narvaez et al., 2019; Hill et al., 2019). Observations in this context reveal that crowd sexual behavior at MCF can be categorized into two types: casual sex and sexual harassment. The study reveals that casual sex involves willingly engaging in sexual activity with a partner. However, it also highlights the potential risks associated with casual sex at MCF, where festival-goers and concert-goers may engage in sexual activity with multiple stranger partners (Garga et al., 2021; Janssen et al., 2021). Specifically, Garga et al. (2021) have found that festival-goers and concert-goers engage in casual sex while intoxicated and without a condom. The consequences of engaging in multiple casual sexual encounters can culminate tragically when individuals contract HIV and experience trauma. Narvaez et al. (2019) cited evidence from another source, indicating a connection between the use of club drugs and higher rates of HIV infection.

On the other hand, sexual harassment at MCF can be defined as instances of sexual violence (Bows et al., 2022). Statistics indicate that 90% of women attending MCF have experienced sexual harassment (Bows et al., 2022). In-depth qualitative methods were employed by Hill et al. (2019), revealing a societal lack of focus regarding sexual violence. Similarly, Bows et al. (2022) indicated that this risk behavior has become normalized within society. In light of this gap, which has resulted in significant impacts, sexual harassment significantly affects an individual's emotions, perspective, and overall well-being. For example, Hill et al. (2019), outlined various effects of sexual harassment experienced by females at music festivals and concerts. These effects include heightened vigilance and concern for personal safety, choosing to attend fewer events, adjusting clothing or behavior, modifying their use of festival spaces (such as avoiding the mosh pit circle), reducing or abstaining from alcohol and drug consumption (Hill et al., 2019). Additionally, Hill et al. (2019) cited a

comprehensive study conducted by Fileborn (2019), which found that crowd may experience emotions such as anger, shock, and anxiety, along with decreased tolerance for harassment and antisocial behavior, an increased willingness to intervene as bystanders, and a loss of trust, particularly towards men and security personnel (Hill et al., 2019).

One form of risk behavior, known as aggressive behavior, occurs when individuals harm or injure another person (Tuvblad, 2019). In the context of MCF, aggressive behavior arises when the crowd dances aggressively, potentially causing harm to other festival-goers and concert-goers (Barnes & White, 2019; Milsten et al., 2017). This type of aggressive behavior in MCF settings is commonly referred to as mosh pits (Palmer, 2005). The phenomenon of mosh pits has experienced significant international growth and development over time. According to Barnes & White (2019), in the mosh pit, a distinctive crowd arrangement, attendees engage in vigorous dancing to interact with the artists, music, and one another. Nonetheless, it is important to note that mosh pits can pose risks, including incidents of crowd behaviors (Barnes & White, 2019). However, Riches (2011) has indicated that mosh pits have benefits that can positively impact festival-goers and concert-goers. Instantly, mosh pits can serve as an escape from any problems festival-goers and concert-goers may have, allowing them to release tension and experience ecstasy within the circle of the mosh pit, thus significantly enhancing their pleasure and happiness (Riches, 2011). In contrast, Barnes & White (2019) vehemently challenge Riches's (2011) assertion, contending that although mosh pits may benefit some festival-goers and concert-goers, mosh pits can also inflict harm on others, often without their knowledge (Barnes & White, 2019). Barnes & White (2019) also mention that mosh pit involves actions such as strangling, kicking, and forcefully tackling intended to injure another person. The review paper by Milsten et al. (2017) revealed that the mosh pit poses greater harm to the well-being of festival-goers and concert-goers. Other than that, the mosh pit also has a significant impact on crowd behavior. Milsten et al. (2017) mentioned that mosh pits increase the likelihood of injuries occurring at MCF, especially at a Rock concert. The review by Milsten et al. (2017) referenced a comprehensive study conducted by Janchar et al. (2000), which highlighted that 33% of the total crowd who came to the hospital were identified as having injuries related to mosh pits. Milsten et al. (2017) also highlight that 15% of injuries were cuts and scrapes, while 20% involved musculoskeletal damage. In conclusion, the review paper by Milsten et al. (2017) underscores the substantial impact of mosh pits on the safety and well-being of attendees.

The normalization of drug use at Music Concerts and Festivals (MCF) has contributed to an environment where attendees are increasingly inclined toward engaging in risky behavior (Alhajri et al., 2023). Interestingly, contemporary attendees have increasingly been combining multiple drugs, a phenomenon known as polydrug or substance use (Ponnet et al., 2023; Istvan et al., 2023; Black et al., 2020; Ponce et al., 2019; Calle et al., 2019; Luther et al., 2018). Polydrug use involves the combination of various substances, including “cannabis, marijuana, weed, hash, cocaine, speed or amphetamines, ecstasy or MDMA, magic mushrooms, LSD, and ketamine” (Ponnet et al., 2023, para. 2). On the other hand, Polydrug also can be a combination of drugs and alcohol (Hutton et al., 2021). Moreover, Black et al. (2020), have stated that it has now become the norm among attendees to use polydrug at MCF. The survey was conducted through Facebook ads to identify whether respondents used polydrug at MCF, and the results showed that 91.80% out of 304 respondents had used more than one drug at MCF (Ponnet et al., 2023). In comparison, the OCTOPUS French cross-sectional survey, employed in the study by Istvan et al. (2023), proved to be more appropriate. Specifically, the findings indicated that 314 individuals predominantly used cannabis, ecstasy/MDMA, and cocaine (Istvan et al., 2023). Both statistics confirm the assertion made by Black et al. (2020) that attendees often use illicit drugs at MCF.

Additionally, Lim et al. (2009) found that young people are the primary demographic affected by the harmful effects of drugs. Moreover, Black et al. (2020) reported the deaths of two individuals due to drug use during MCF in New South Wales, Australia, in September 2018. Similarly, Hutton et al. (2021) cited a news report by The Guardian as the source of evidence that six individuals lost their lives due to a combination of substance use, including drugs and alcohol at MCF. Both researchers have provided clear evidence on how the effect of substance use can harm festival-goers and concert-goers. Additionally, the case study by Chhabra et al. (2017) has highlighted that cases related to substance use often inundate the emergency department at hospitals. The findings of the case study revealed that 28 patients who used illicit drugs at MCF were brought to the emergency department, with several of them experiencing musculoskeletal issues (Chhabra et al., 2017). Thus, it has been identified that musculoskeletal issues are among the harmful effects of drug substances.

Demographic Trends Related to Risk Behavior at MCF: The majority of festival-goers and concert-goers engaging in risk behavior at MCF are from the young demographic, as evidenced by the involvement of underage individuals in alcohol consumption. According to Feltmann et al. (2019), the result finding of the cross-sectional study indicates that most of the respondents disagreed with underage involvement with alcohol. Subsequent research by Feltmann et al. (2020) delved into the legal aspects of distributing alcohol to youths under eighteen, highlighting its prohibition.

Next, most casual sexual encounters are predominantly reported among young adults, as highlighted in the study by Garga et al. (2021), underscoring the prevalence of such risk behavior within this demographic group at MCF. Turning to the risk of sexual harassment, as highlighted by Hill et al. (2019), females are identified as the primary victims of sexual harassment at MCF. Approximately 34% of females have faced incidents of sexual harassment, and this issue is not exclusive to females alone (Bows et al., 2022). Conversely, men are also not exempt from this risk, with around 6% of males also experiencing sexual harassment at MCF (Bows et al., 2022).

Moreover, illicit drug consumption at MCF has also been determined to be highest among the young adult demographic (Hutton et al., 2021; Black et al., 2020). Specifically, both researchers have highlighted that festival-goers and concert-goers aged 23 to 25 are actively involved with drugs at MCF. The number of cases related to harm associated with this behavior has rapidly increased, Hutton et al. (2021) reported that six individuals lost their lives due to a combination of substance use, including drugs and alcohol. Similarly, Black et al. (2020) reported the deaths of two individuals due to drug use during MCF in New South Wales, Australia, in September 2018. Riches (2011) has stated that while mosh pits are mainly populated by males, they are not exclusive to this gender and also include females. The report by Riches (2011) has shown that mosh pits are notable among female fans, as females desire to join the circle to participate in it and indirectly experience ecstasy. However, to broaden the demographic, Milsten et al. (2017) have noted that mosh pit dancing is prevalent among young adults.

Safety Measures for MCF Crowds: The consequences of risk behavior on the festival-goers and concert-goers at MCF have caused concern to others. Several strategies provided by researchers have the potential to be applied at MCF to prevent this problem. Among the suggestions is one from Feltmann et al. (2020), who discuss the best strategies to prevent alcohol intoxication, which is to abide by the Alcohol Act. This entails refusing to serve alcohol to visibly drunk festival-goers and concert-goers and denying them entry into the MCF event. Another suggestion by Feltmann et al. (2020), that can be applied to MCF is to prohibit both the serving and consumption of alcohol during the event. Therefore, this successful strategy has been applied by MCF in Sweden with the statement 'Alcohol-Free' (Feltmann et al., 2020).

Many parties have made efforts and planned various strategies to prevent sexual risk behavior at MCF. In line with this, Janssen et al. (2021) surveyed to evaluate the impact of the campaign on exposure to sexually transmissible infections (STIs). The campaign is one of the initiatives by the government of the NSW Ministry of Health to curb this risky behavior. The results indicated that this campaign is effective in promoting casual sexual health among young people by increasing awareness and encouraging them to undergo STI screening (Janssen et al., 2021). Based on the issues addressed by Bows et al. (2022), the layout of MCF often provides opportunities for men, especially, to harass and assault women. Therefore, Bows et al. (2022) have suggested adopting the best strategy proposed by Vera-Gray and Kelly (2020), known as 'safety work,' to prevent this issue at MCF. 'Safety work' refers to the various actions and precautions women take to enhance their safety and reduce the risk of sexual violence, including avoiding certain spaces (Vera-Gray and Kelly, 2020). Similarly, Hill et al. (2019) have also suggested adopting the best strategy proposed by the Women's Liberation Movement, which advocates for the creation of 'safe spaces' originally conceptualized by radical feminists during the 1970s Keenan and Darms (2013), to provide save space at MCF. However, Hill et al. (2019) have urged that this strategy needs to be adapted and made more inclusive. Specifically, it should be tailored to accommodate diverse needs, such as providing spaces for LGBTQ individuals who also frequently experience sexual harassment. Thus, all the strategies in sexual risk behavior are considered best practices for implementation at MCF. In addition, the procedures for preventing polydrug use at MCF have been predominantly discussed by researchers (Ponnet et al., 2023; Ponce et al., 2019; Hutton et al., 2018; Luther et al., 2018). Understanding the risk behavior of festival-goers and concert-goers by event planners and on-site

medical departments is crucial (Hutton et al., 2018). Hutton et al. (2018) proposed several strategies to address these behaviors, emphasizing the role of health coordinators at MCF in raising awareness. This includes promoting health messages, particularly regarding polydrug use, to mitigate incidents such as injuries and harm (Hutton et al., 2018).

Meanwhile, Ponce et al. (2019) conducted a cross-sectional survey to evaluate the connection among personality characteristics, the use of multiple substances, and strategies for minimizing harm among festival-goers and concert-goers. The nine strategies questions are "Buy drugs from a reliable source; Plan my drug use sessions; Set limits on the quantity of drug used; Space out sessions/parties where use drugs; Avoid mixing depressants; Take smaller doses instead of larger doses; Avoid mixing stimulants; Use lower quantity when combining drugs; and Wait for the effects of a dose to decrease before taking another one" (Ponce et al., 2019). Thus, the findings suggest that individuals with higher levels of impulsivity are less inclined to frequently utilize the identified harm-reduction strategies (Ponce et al., 2019). However, despite their potential benefits, the effectiveness of these strategies may be constrained by variations in personality and behavior among festival-goers and concert-goers (Ponce et al., 2019).

In addition, Ponnet et al. (2023) have suggested that the implementation of pill testing, informational sessions on the negative effects of substance use, and provision of free water services can be effective solutions for alleviating the severity of side effects associated with polydrug use. Ponnet et al.(2023) have also suggested the drug-checking strategy proposed by Haug et al. (2023) before entering MCF. To conclude, applying the strategies recommended by researchers with constant care and vigilance enhances the efficacy and efficiency of MCF and indirectly can prevent this issue.

Transitioning to strategies concerning the mosh pit. Milsten et al. (2017) emphasized that while the Occupational Safety and Health Administration (OSHA) develops guidelines primarily for ensuring workplace safety, these regulations can also be valuable for effectively managing mosh pit crowds at MCF. For instance, measures such as hiring additional staff, including qualified security, and implementing crowd control strategies can help enhance safety (Milsten., 2017). Another strategy suggested by Tarlow (2002) for managing the mosh pit during performances is to guide festival-goers and concert-goers away from the center of the mosh pit circle. Therefore, this approach helps protect those who do not participate in the mosh pit from potential injuries or harm.

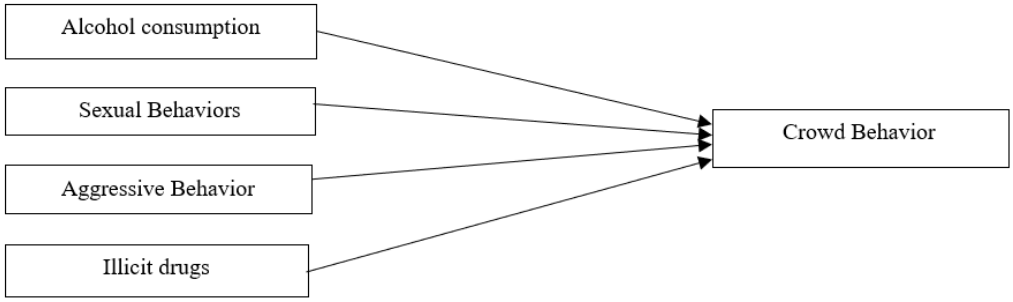
Neglecting Risk Management - A Concern for Safety at Malaysian MCF: MCF has grown steadily each year in Southeast Asia, with Malaysia being a particular focal point. Specifically, focuses on MCF in Malaysia, a country actively engaging with the global music scene and showcasing a diverse array of events spanning various genres. For instance, the Rainforest World Music Festival 2023 not only highlights Sarawak's rich musical heritage but also seamlessly blends the region's unique music genres and culture in this grand festival (New Straits Time, 2023). With the hosting of this kind of music festival in Sarawak, the state has solidified its standing as a regional hub for music tourism and performing arts, as reported by the New Straits Times in 2023.

In line with the development of the MCF industry in Malaysia the Occupational Safety and Health Act 1994 – Act 514 (OSHA). This act is established to ensure the welfare, safety, and health of Malaysian workers. A previous study by Mohd Khir et al. (2019) found that the establishment of the Occupational Safety and Health Act 1994 – Act 514 (OSHA) is crucial in the Malaysian event industry, especially in the context of MCF. This act proves to be instrumental in controlling crowds, particularly in mitigating risks among attendees, and organizers are required to adhere to this act. The author also stated several other legislations relevant to the context of the Malaysia event industry, such as the Factories and Machinery Act 1967 (Act 139), Environmental Quality Act 1974 (Act 127), Explosives Act 1957 (Act 207), Peaceful Assembly Act 2012 (Act 736), Fire Services Act 1988 (Act 341), Civil Aviation Act 1969 (Act 3), and Employees' Social Security Act 1969 (Act 4).

However, despite the regulatory framework provided by legislation such as OSHA, the lack of understanding of risk behavior has also affected Malaysia, leading to crowd behavior, albeit not as prominently as internationally. Nonetheless, evidence shows that cases and incidents related to crowd behaviors are gradually increasing in Malaysia. For example, crowd behavior incidents occurred at the Future Music Festival 2014, leading to 19 attendees involved in drug cases and the deaths of six attendees due to excessive doses at the same event

(Tangit et al., 2016). Ismail et al. (2021) conducted in-depth qualitative interviews among festival-goers and concert-goers. The study discovered instances of sexual risk behavior, alcohol consumption, and drug use at MCF. Further findings indicate that most interviewees reported firsthand observations of individuals sneaking drugs, and alcohol, and engaging in intimate conduct during MCF (Ismail et al., 2021). Based on this previous finding, sneaking drugs and alcohol has been identified as a major issues in crowd behavior at MCF events in Malaysia. Additionally, there is evidence of mosh pit incidents occurring in Malaysia in 2023, though fortunately, no injuries or harm were reported (New Straits Times, 2023). While Malaysia may have lower statistics on incidents related to crowd behavior at MCF, the situation highlights a concerning trend: organizers frequently neglect effective risk management practices, thereby increasing potential safety concerns at these events. Finally, after conducting the literature review, the crowd behaviors research framework has been developed for the development of predictive models (Figure 1).

Figure 1: Development of Predictive Model



3. Research Methodology

Previous studies on risk behavior in Malaysia have predominantly utilized a single method (Tangit et al., 2016; Ismail et al., 2021), resulting in limitations in the available data. To address this issue, the proposed research study employs a mixed-method approach, integrating both quantitative and qualitative techniques, which is considered the best strategy for comprehensively understanding the research problem (Creswell, 2018). By using both methods the result offers more robust conclusions compared to employing either method independently (Creswell, 2014). The proposed research study will also apply the sequential explanatory strategy, where the first phase will utilize the quantitative method, followed by the qualitative method in the second phase (Creswell, 2018). This strategy aims to obtain preliminary results through the pilot study using a quantitative method in the first phase, followed by a comprehensive analysis in the second phase using qualitative methods.

In the first phase, the researchers will investigate the perspective of the crowd, which refers to the demographic population of festival-goers and concert-goers in Malaysia. The sampling technique for this phase will utilize its non-probability sampling, specifically convenience sampling. Convenience sampling involves selecting respondents based on convenience and practicality, making it suitable for pilot testing (Sundram et al., 2016). This sampling technique is appropriate for the study because the researchers will conduct the pilot test at any MCF event in Malaysia that is available at that particular time. Moreover, the instrument used in the study will be a survey, specifically employing a questionnaire. According to Sudram et al. (2016), questionnaires yielded the most accurate results, indicating that the data collected was valid and reliable. Researchers opted for this instrument due to unreliable data in past studies (Ismail et al., 2021), and by utilizing surveys, the researchers aim to mitigate such issues in future studies. The quantitative data analysis will be conducted using the Statistical Package for the Social Sciences (SPSS), Partial Least Squares Structural Equation Modelling (PLS-SEM) will also be applied.

After that, the data explored in phase one will be refined, analyzed and utilized in the second phase to conduct further in-depth investigations. The qualitative stage will focus on in-depth interviews, a method that enables researchers to understand and explore the interviewees' social world (Rutledge and Hogg, 2020). This method facilitates the collection of rich data from interviewees' words, metaphors, pictures, and feelings. The second

phase will commence with the researcher selecting festival-goers and concert-goers from MCF. Then, these selected people will participate in focus group discussions. This type of data collection will enable participants to express their opinions by responding to questions from the moderator and engaging in discussions with one another, where they can share stories and comment on each other's perspectives (Krueger and Casey, 2014).

The next step involves data analysis, during which researchers will explore, describe, report, interpret, and validate the data obtained from the focus group discussions using thematic analysis. Nowell et al. (2017) have highlighted many benefits of applying thematic analysis in data analysis, including its usefulness in summarizing key features of a sizable data collection and facilitating a structured approach to handling data. Thematic analysis helps researchers produce systematic and conclusive final results that can identify important themes, ultimately leading to the development of a crowd behavior predictive model.

In summary, the study will utilize a mixed-method approach employing a sequential explanatory strategy consisting of two phases. The first phase involves distributing surveys among attendees at MCF, while the second phase refines the data collected in phase one. Focus group discussions will be conducted with selected participants from festival-goers and concert-goers, and thematic analysis will be applied to interpret the qualitative data.

4. Conclusion

As previously mentioned, even though music concerts and festivals (MCF) hold the potential for profitability, they also carry risks associated with the event venue and crowd (Tenu and Ciocoiu, 2020). Tenu and Ciocoiu (2020) argued that the presence of risk is a crucial factor in assessing the success and quality of an event. Unfortunately, there have been instances at MCF where risky behavior, particularly concerning alcohol, drugs, sexual behavior, and mosh pits, was not taken seriously by organizers and was met with indifference (Alhajri et al., 2023). It has become normalized for attendees to engage in undesirable behaviors at music concerts and festivals, highlighting the critical need to address this issue for the sake of the economic future and the well-being of the crowd. To address this issue, this study will focus on exploring crowd behavior at MCF.

This study will have the capacity to identify and understand the risk behavior among attendees. It is expected that this study will help organizers enhance their knowledge of risk behavior within the MCF industry. The study also highlights effective solutions to assist organizers of MCF events in Malaysia in addressing issues such as sneaking drugs and alcohol, mosh pit incidents, and inappropriate sexual behavior among attendees.

Primally, the proposed research framework will be an important reference in developing a predictive model of crowd behavior. This research framework will serve as the initial step for organizers to identify and understand risk behaviors. Additionally, it will be beneficial for festival-goers and concert-goers to recognize risk behaviors in which they may have indirectly participated, potentially reducing such behaviors at MCF. Subsequently, the predictive model of crowd behavior is expected to be beneficial for organizers in analyzing anticipated future risk behavior among crowds during the planning phase.

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