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URBAN DEFENSE INDEX FOR CITY BRANDING: A CASE STUDY OF FIVE CITIES IN KALIMANTAN

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ABSTRACT

This paper proposes a new model of urban security for city branding in Indonesia, which aims to address the gap in city branding indices lacking safety and security factors. The proposed model, the Urban Defense Index (UDI), measures a region's ability to manage risks and handle security threats in urban areas. The UDI is calculated based on three sub-indices: Threats-Disruptions- Obstacles- Challenges (TDOC), Posture, and Stability, which use objective and subjective measurements. A case study uses the proposed model to measure five Kalimantan cities' urban defense readiness levels. The study found that Stability, Posture, and TDOC are essential factors in determining the level of urban defense readiness in the cities. Future research can address the limitations of the UDI model proposed in this study and expand the UDI model to include other factors that affect urban security.

Keywords: *Urban Defense Index, City Branding, Security Benchmark Concept, Kalimantan, Indonesia*

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Introduction

City security is a crucial element in city branding as it can significantly impact a city's reputation and attractiveness to investors, businesses, and tourists. A city with a reputation for being safe and secure is more likely to attract a diverse range of visitors and businesses, contributing to its economic growth and development.

Moreover, adequate security measures, such as police patrols, CCTV cameras, and emergency response teams, can enhance residents' sense of safety and well-being, fostering a strong sense of community and pride. Thus, city security is pivotal in building and promoting a positive city brand, showcasing a city as a safe and secure place to live, work, and visit.

City security refers to the efforts made by the government and law enforcement agencies to prepare the city to be safe from crime and other emergencies. On the other

hand, city safety emphasizes the perception and awareness of the public in dealing with situations that may endanger them, as well as the availability of safe and well-maintained public facilities. In city branding, both are essential in building a positive image of the city and attracting investment and tourism. Therefore, efforts to improve city security and city safety should be integrated and involve community participation to create a safe, comfortable, and attractive city.

The "city security" concept has received less attention in city branding than "city safety." While city safety emphasizes the prevention of accidents and hazards, city security primarily focuses on the mitigation of crime and the maintenance of law and order. Marcuse (2006) found that the threat of terrorism is being used to sell the idea of security instead of safety. However, security concerns are increasingly important factors influencing a city's reputation and desirability among visitors, investors, and residents. Several studies have shown that city security branding is a potent tool for image-building and can aid in policy development and image management for cities. Kavaratzis & Ashworth (2005) identified it as a powerful image-building strategy, while Kavaratzis (2004) suggested that it can be used to develop policy and manage a city's image. Parkerson & Saunders (2005) proposed that adopting the systems and structures of generic branding models would enhance the effectiveness of city security branding. A city's image as a safe and secure destination is integral to building a positive brand identity. Thus, city security should be viewed as a critical aspect of city branding. It is essential to highlight the measures taken to ensure the safety and security of residents and visitors in a city, including surveillance technology, emergency response systems, and law enforcement agencies. Therefore, a comprehensive approach to city branding should incorporate city safety and security concepts to promote a holistic and positive image of a city.

We estimate that data collection in the context of city security can be more challenging than city safety due to the government or security agencies' tendency for security-related data to be considered sensitive and kept confidential. Furthermore, information on ongoing security threats may not always be available to the public. On the other hand, data related to city safety, such as accidents and emergencies, is more accessible through public reports and data from emergency services such as fire departments and hospitals. Generally, efforts to overcome data limitations in city security are addressed by processing proxy data of the city security model.

In this paper, our proposed model of urban security for city branding was inspired by a critique of how city branding is evaluated. Mahmoudzadeh et al. (2014) suggest that safety and security factors are less important than other factors in city branding. However, it should be noted that this survey only asked experts for their opinions and not for empirical evidence. Kavaratzis (2004) suggests that city branding can effectively manage a city's image, promoting economic development and social inclusion. The critics note that the city's current branding indices do not involve many safety and security factors, such as the Anholt-GfK Nation's Brand Index and the European Saffron City Brand Barometer-Vitality Index. They focus more on economic and cultural factors, ignoring the critical dimensions of safety and security (Parkerson & Saunders, 2005; Sevin, 2014). In addition, some indexes suitable for city branding, such as the Economist Safe Cities Index (SCI), are perceived as more ideal for developed cities. It is expensive and challenging to implement in most cities in Indonesia. Thus, there is a significant gap in the existing indices for city branding. The SCI is also unsuitable for Indonesian cities because it does not consider the defense geography perspective (Kapiarsa et al., 2020). Adapting the SCI or formulating a new index that suits Indonesian cities' characteristics is necessary to measure safety and security perception and incorporate it into the city branding evaluation and recommender system (Risdiana & Susanto, 2019).

The study offers significant perspectives for city stakeholders and local governments in enhancing city security and developing a favorable city image via city branding, which will allow policymakers and city managers to gauge and oversee the perception of safety and security

in their cities and identify areas that need improvement to establish a robust and sustainable city brand. The research question is, "What kind of security benchmark concept is suitable for city branding in Indonesia, and how is it formulated?" The study will involve surveys with 400 stakeholders and expert interviews conducted through focus group discussions (FGDs) in the research locations.

The choice of the locus for this study was based on the premise that Kalimantan, the third largest island in the world, is home to five provincial capitals. These cities are Pontianak, Banjarmasin, Samarinda, Palangkaraya and Tarakan. The five cities support developing Indonesia's new capital city, which will replace Jakarta. Apart from that, Kalimantan's strategic location and natural resources also make it a vital area for defense purposes. Thus, utilizing these aspects is under the study's objectives and can elaborate discussions that lead to policy recommendations.

Literature Review

This study offers a unique perspective on city branding by incorporating the perception of national security defense as a crucial factor in shaping a city's identity. Such a perspective is rarely used to formulate city branding strategies. By doing so, this study offers a new approach to city branding that acknowledges the importance of national security defense in shaping a city's image and identity.

Moreover, this study also introduces the Urban Defense Index (UDI) as a tool for assessing a city's defense capability and as a decision-making tool for city branding. The UDI comprehensively evaluates a city's defense capability, covering various security dimensions such as military, police, and emergency services. The UDI can provide a helpful benchmark for cities to assess their strengths and weaknesses in terms of defense capabilities and to identify areas for improvement. Using UDI in city branding can help promote a city's image as a safe and secure destination for visitors and investors.

In the following, we describe the basis for discussing indexation in city branding as the basis of the proposed UDI.

City Branding vs Urban Risk

Several studies have explored the relationship between city branding and urban risks. According to (Yang et al., 2019a), city branding can be used to mitigate the negative impact of urban risks on the image and reputation of a city. They argue that a strong city brand can help create a positive image of a city that can withstand adverse events, such as natural disasters, and enhance its resilience.

Similarly, (Abd Ghafar et al., 2022) argue that city branding can play an essential role in enhancing the safety and security of a city. He suggests that a strong city brand can attract investment in security infrastructure and help to create a culture of safety and security within the city. In addition, a strong city brand can enhance the coordination and collaboration among different stakeholders in addressing urban risks. However, other studies have highlighted the challenges of city branding in the face of urban risks. According to Moilanen (2015), city branding can be challenging to achieve in cities that face frequent and severe urban risks. He argues that the negative impact of urban risks on the image and reputation of a city can outweigh the benefits of city branding and that cities need to prioritize risk management over branding.

Moreover, several studies have identified the strategies cities can use to mitigate urban risks and enhance their brand image. For instance, (Shirvani-Dastgerdi & De-Luca, 2019) suggest that cities can use their response to urban risks as an opportunity to build a positive brand image. They argue that well-prepared cities with effective risk management strategies can enhance their brand image and attract investment, tourism, and residents. Similarly,

(Srivastava & Shaw, 2016) argues that city branding can enhance a city's resilience in the face of urban risks. He suggests that cities use their brand image to create a sense of community and shared values, enhancing social cohesion and collaboration in addressing urban risks. In all, the literature suggests that there is a complex relationship between city branding and urban risks. While a strong city brand can enhance the resilience and safety of a city, it can also be challenging to achieve in cities that face frequent and severe urban risks. However, cities can respond to urban threats to build a positive brand image and enhance their resilience and social cohesion in the face of urban risks.

Finally, when exploring city branding studies in Kalimantan focusing on urban risk, we found that studies are generally conducted qualitatively. These studies aim to achieve a competitive advantage that would allow the city to increase the attraction of investment and tourism, strengthen local identity, and avoid social exclusion (Maulina & Atika, 2019; Widiastuti et al., 2019). Meanwhile, studies on urban risks in Kalimantan mainly focus on fires (Nugroho, 2017; Sloan et al., 2017) and floods (Wells et al., 2016), as well as problems related to infrastructure and culture (Aldilla & Michael, 2022).

On the other hand, this study adopts a quantitative approach to index formulation, which can enrich the study of city branding in Kalimantan. By utilizing the Urban Defense Index (UDI) as a tool for assessment and decision-making, this study contributes a new perspective on city branding that is rarely used as a basis for formulation strategies. The UDI can serve as a means to identify potential threats to the city, such as terrorism, cyber-attacks, and natural disasters, and formulate a comprehensive urban defense plan. Therefore, this study can offer valuable insights for policymakers and practitioners in Kalimantan's city branding and urban risk management field.

Existing Service Standards on Urban Risk Management

Urban areas face many risks, including natural disasters, pandemics, terrorism, and cyberattacks. Effective management of these risks is crucial for ensuring urban residents' safety and security and maintaining urban areas' resilience. This literature review aims to explore the existing service standards on urban area risk management and to identify the best practices and challenges in implementing these standards.

Various research findings provide valuable insights into the development of service standards for urban area risk management. Chen et al. (2021) proposed a method system to assess urban safety and security, while Edjossan-Sossou et al. (2014) proposed a methodology for evaluating the sustainability of natural risk management strategies. Renn et al. (2018) and Damsari et al. (2022) suggest that risk governance, the storm surge disaster loss (SSDL), the GRaBS assessment tool, and early warning systems are key approaches to risk-sensitive urban development. By integrating these approaches, policymakers and city managers can identify areas for improvement and develop strategies to strengthen urban resilience, creating safer and more secure urban environments. Integrating research findings in urban risk management can enable cities to anticipate better and respond to emerging risks and hazards, leading to sustainable and resilient urban development. According to the International Organization for Standardization (ISO), ISO 22320 provides guidelines for emergency management, including risk assessment, planning, and response. ISO 22320 is designed to be adaptable to different types of emergencies and contexts and provides a framework for coordinating emergency management across various organizations and sectors. Similarly, the United Nations International Strategy for Disaster Reduction (UNISDR) has developed guidelines for urban risk reduction, known as the "Making Cities Resilient" campaign. This campaign guides risk assessment, planning, and implementation, as well as the role of different stakeholders in urban risk reduction (Johnson & Blackburn, 2014).

The best practices in urban area risk management include using integrated frameworks, developing early warning systems, and implementing public education and

awareness programs (Kavaratzis, 2004). Effective implementation of these practices requires the involvement of different stakeholders and the use of innovative technologies. According to (Roslan et al., 2021), these challenges include the lack of data and information, the lack of political will and commitment, and the lack of coordination among different stakeholders. There are existing service standards on urban area risk management, such as ISO 22320 and the "Making Cities Resilient" campaign. The best practices in urban area risk management include using integrated frameworks, developing early warning systems, and implementing public education and awareness programs. However, there are challenges in implementing these standards, such as the lack of data and information, political will and commitment, and coordination among different stakeholders. Addressing these challenges requires a holistic and participatory approach to risk management, which involves different stakeholders and promotes sharing information and resources.

It is challenging to find journals that explain the Existing Service Standards on Urban Risk Management, focusing on cities in Kalimantan. However, it is common knowledge that the standards of urban risk management that we have described, based on their implementation in other locations, can be useful in the context of city branding in Kalimantan. While there may not be a specific journal that discusses urban risk management with a focus on Kalimantan, existing literature on the topic can still be relevant and informative. The service standards for urban risk management that we have outlined can be applied to other locations, including Kalimantan, and can be a valuable resource for those involved in city branding efforts in the region. Despite the lack of specific literature on this topic, there is still much to be learned from existing research and standards to promote sustainable development and effective urban risk management in Kalimantan.

Critics of the Existing Indices for City Branding

The Anholt-GfK Nation Brands Index (Feinberg & Zhao, 2011), Saffron European City Brand Barometer (Zheng et al., 2020), and Creative Cities International—The Vitality Index (Rodrigues & Franco, 2019), are all widely used indices in city branding. While they provide valuable insights into various aspects of a city's brand and reputation, a significant gap exists in their ability to measure the perception of safety and security.

The Anholt-GfK Nation Brands Index focuses on six dimensions of a nation's brand: governance, exports, culture, people, tourism, and investment. While some of these dimensions are tangentially related to security, there is no explicit measurement of a nation's security or safety record. Similarly, the Saffron European City Brand Barometer measures a city's brand based on the quality of life, culture, and tourism. Still, again, there is no direct measurement of a city's safety or security.

The Vitality Index, produced by Creative Cities International, focuses on a city's economic and cultural vitality. While this index is useful in measuring a city's strengths and weaknesses in these areas, it does not provide any meaningful insight into the city's safety and security. Given the increasing importance of safety and security in shaping a city's brand and reputation, indices such as these must incorporate a specific dimension for measuring these factors. Without such a dimension, the indices may miss critical information vital for cities to understand and address to build a strong and sustainable brand. Therefore, future iterations of these indices must include explicit measures of a city's safety and security record.

In the context of city branding with a focus on Kalimantan, there is a need for an index that specifically measures a city's safety and security perception, given the challenges of urban risk management in the region. While existing indices such as the Anholt-GfK Nation Brands Index, Saffron European City Brand Barometer, and Creative Cities International—The Vitality Index are useful in measuring various aspects of a city's brand and reputation, they do not provide any direct measurement of safety and security. Somewhat mention, the existing indices have gaps, particularly in the context of Kalimantan, where issues such as fire

and flood risk are prevalent. Therefore, the formulation of the Urban Defense Index (UDI) can potentially address this gap by providing a specific measure of safety and security in the context of urban risk management. However, the UDI must be formulated to include relevant and context-specific indicators for Kalimantan, and it should be tested and validated in this context to ensure its usefulness and effectiveness.

Factors of the Existing Indices for City Branding

Table 1: Major models of city branding

Framework	Category	Index
Citizen Satisfaction Index (Zenker et al., 2013)	Urbanity and density	Cultural activities, shopping opportunities, services, openness, etc.
	Nature and recreation	Green area, environmental quality, parks, outdoor activities, tranquility, etc.
	Job opportunities	Wages Level, job and promotion opportunities, economic growth, professional networks, etc.
	Cost-e	The housing market, price level, availability of apartments and houses, etc.
	Overall satisfaction	Level of satisfaction, etc.
Brand Images (Business Tourism) (Hankinson, 2005)	Physical environment	Attractive environment, interesting architecture, etc.
	Economic activity	Tourism/industrial, leisure/business, etc.
	Business tourism facilities	Conference facilities, venues, standards, etc.
	Accessibility	Transport links, etc.
	Social facilities	Suitable for incentive events, etc.
	Strength of Reputation	Marketing, identity, etc.
	People's characteristics	Vibrant/retirement place, young, etc.
	Size	Cities/suburbs, smaller/bigger cities, etc.
	Other	Dimensions relating to cost, international associations, etc.
The Anholt-GMI City Brands Index (Anholt, 2006)	Presence	Familiarity, cultural contribution to the world, etc.
	Place	Suitable for tourism, city image, etc.
	Potential	Economic and educational opportunities, etc.
	Pulse	Excitement, how easy it is to find interesting things, etc.
	People	Inhabitants, friendliness, etc.
	Prerequisites	Basic qualities of the city, public amenities, etc.
City Branding (Merrilees et al., 2013)	Nature	Green belts, outdoor areas, etc.
	Business/job opportunities	Innovation, local business, etc.
	Shopping	Cafes, homewares stores, etc.
	Transport	Developed road networks, etc.
	Cultural activities	Live shows, entertainment activities, etc.
	Government services	Public healthcare access, education faculties, etc.
	Social bonding	Family life, cultural diversity, etc.
	Brand	Reputation, lifestyle, etc.

Source: (Yang et al., 2019b)

Table 1 shows major city branding models and their respective categories and indices. However, the index in the table is not specific to urban security, which is the article's focus being analyzed. While these indices may contribute to a city's overall brand image and perception, they do not directly address the important aspects of urban security, such as crime prevention, emergency management, and community participation in security initiatives. Therefore, a

more specific and comprehensive set of indices is needed to develop an Urban Defense Index for City Branding.

Based on a review of the articles, the crucial factors that could be considered as constructs in formulating an "Urban Defense Index for city branding" are shown in Table 2. Then, the components in Table 3 can be compared or supplemented with SCI factors. The features of the Safe Cities Index (Berg et al., 2019; Phillis et al., 2017) can essentially be adopted into the Urban Defense Index (UDI) with some modifications to the measurement methods for each component - adjusted to the general conditions of cities in Indonesia. To create a more relevant and accurate index, we formulated a measurement instrument of the UDI and tailored it to suit the unique characteristics and challenges Indonesian cities face. We describe the steps in the next section.

Table 2: Optional Factors for Formulating an "Urban Defense Index for City Branding."

Factors	Definition	Authors and Year	Dimension
Level of crime and violence	Includes factors such as the incidence of violent crimes, property crimes, and other criminal activities in the city.	(Risdiana & Susanto, 2019; Rosenthal & Ross, 2010; Setiawan, 2017)	Crime and violence
Effectiveness of law enforcement	Includes factors such as the responsiveness of the police, the quality of investigations, and the effectiveness of the criminal justice system.	(Chan & Marafa, 2013; Vanderschueren, 1996)	Law enforcement effectiveness
Quality of infrastructure	Includes factors such as the quality of roads, public transportation, and other infrastructure that contribute to the safety and security of the city.	(de Jong et al., 2018; Vanolo, 2017; Yang et al., 2019a)	Infrastructure quality
Level of community participation	Includes factors such as the level of engagement and involvement of residents in community policing programs, neighborhood watch programs, etc.	(Nursanty, 2021; Vanolo, 2017)	Community participation
Level of investment in security infrastructure	This includes factors such as the level of investment in surveillance systems, security cameras, and other city technology.	(Berg et al., 2019)	Investment in security infrastructure
Effectiveness of emergency management	Includes factors such as the quality of emergency response services, the availability of emergency shelters, and the effectiveness of evacuation plans.	(Jørgensen, 2016)	Emergency management effectiveness
Quality of public services	Includes factors such as the quality of healthcare, education, and other public services that contribute to the safety and security of the city.	(Chattalas et al., 2019; Vanolo, 2017)	Quality of public services
Level of social cohesion	Includes factors such as the level of social trust, the level of community engagement, and the extent to which the city promotes social inclusion and equity.	(Bonakdar & Audirac, 2020)	Social cohesion

Methods

To answer the question "What kind of security benchmark concept is suitable for city branding in Indonesia, and how is it formulated?", our approach is a mixed-methods (research design) that combines both qualitative and quantitative methods (Creswell & Creswell, 2018). The research question is primarily answered through the quantitative approach, where we aim to formulate a mathematical equation for the Urban Defense Index (UDI) model. This will be done through data analysis using the Principal Component Analysis (PCA) approach and aggregation. On the other hand, the qualitative approach is used to gather contextual information on city branding and urban security in Kalimantan through field research,

interviews, and focus group discussions (FGDs). This information is used to formulate the model, identify critical factors, and validate the research results with experts in the field. The steps are as follows: i) Literature review: Conduct a literature review on the Urban Defense Index (UDI), city branding, and their relevance in the context of Indonesia; ii) Field research: Conduct interviews with experts in the field of city branding and urban security in Kalimantan, such as law enforcement officers, academics, practitioners, and relevant stakeholders; iii) Formulate a model based on literature and the result of FGD; iv) Conducting case study: Collect data related to factors of the model of five provinces in Kalimantan; iv) Data analysis: Analyze the collected data, identify critical factors using PCA approach and aggregation, and formulating mathematical equation of the UDI model; v) Calculate UDI; and vi) Validation: Validate the research results with experts by conducting the final FGD. Note: Data collection through surveys involves stakeholders with 345 respondents and 34 FGD participants. During FGD, 212 narrative contexts were recorded.

Table 3: Optional Factors for Formulating an "Urban Defense Index for City Branding"

Location of FGD & Survey	Number of Contexts	Number of Participants	Number of Respondents
Balikpapan	52	8	82
Samarinda	32	6	50
Tanjung Selor	32	7	85
Palangkaraya	31	4	56
Pontianak	65	9	72
Total	212	34	345

Source: Authors

Result and Discussion

Model Formulation

All factors resulting from the literature were submitted for review by the participants a week before the FGD. We tabulated the focus of their review themes and produced three categories, as shown in the following figure.

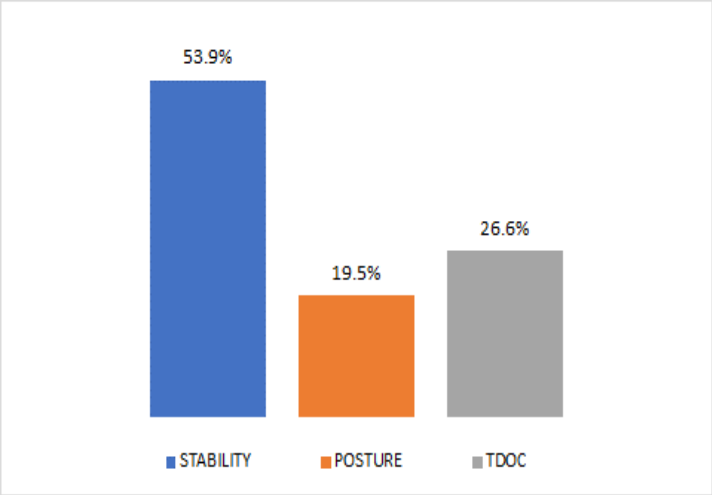

Figure 1: Context themes of 34 FGD Participants from Five Provinces in Kalimantan

Source: Authors

To answer the research question of what kind of index formulation is in urban branding, we formulated the Urban Defense Index (UDI) based on categorizing the context of the FGD

participants. We propose the UDI model for city branding, which measures a region's ability to manage risks and handle security threats in urban areas. Figure 2 shows the proposed model and the mathematical equation as follows:

$$UDI = \alpha * TDOC + \beta * POSTURE + \gamma * STABILITY \quad (1)$$

UDI has three sub-indices: TDOC, Posture, and Stability, which use objective and subjective measurements. By case study, we intend to evaluate to what extent the UDI can predict an urban's ability to manage risks and its readiness to handle security threats. The UDI's conceptual framework is expected to assist city governments in evaluating a region's ability to manage risks and its willingness to address security threats. In the long run, using the UDI can also help governments enhance a region's ability to face various security threats and build a safer and more trustworthy city brand.

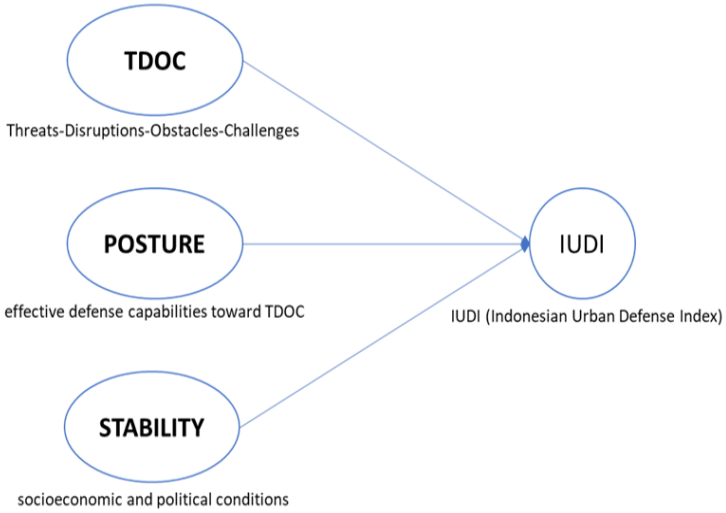

Figure 2: The Proposed Model of UDI

The first category of affecting factors is TDOC (Threats, disruptions, obstacles, and challenges), which can impede city branding purposes. Threats to urban defense can come from various sources, such as natural disasters, terrorist attacks, cybercrime, and pandemics. These threats can cause significant damage to the city's infrastructure, economy, and social fabric. The second is posture, which refers to the readiness of the state apparatus and facilities to manage risks effectively. This includes responding promptly and efficiently to various threats, such as natural disasters, terrorist attacks, cybercrime, and pandemics. A city with a strong posture is seen as proactive and prepared, which can enhance its image and reputation. The third is "stability." Stability refers to the local conditions related to the economy, politics, education, and citizen perception to defend the country. A stable city is safe, prosperous, and conducive to business and investment. Stability is crucial for city branding as it can attract visitors, investors, and businesses. This can be achieved through various measures, such as creating a favorable business environment, investing in education and healthcare, and promoting cultural diversity.

In conclusion, the proposed TDOC, Posture, and Stability model considers critical factors that can significantly affect a city's branding efforts. A city with impediments to city branding but is well-prepared to manage risks and has a stable environment is more likely to attract visitors, businesses, and investments. Therefore, cities must focus on these factors when developing their branding strategies.

Table 4 shows the operationalization of the intended model to form the index. It presents the operationalization of the UDI model in three dimensions: TDOC (Threats, Disruptions, Obstacles, Challenges), Posture, and Stability. Each dimension is defined in terms of specific factors, which are then operationalized using objective data modes (MO) and subjective data modes (MS). The TDOC dimension identifies and measures threats, disruptions, obstacles, and challenges to a city's security and stability. These dimensions have operationalized variables using objective data modes such as the city's number and types of crimes. The Posture dimension refers to the readiness of state apparatus and facilities to manage risks, and its variables are operationalized using objective data modes such as the ratio of TNI, Polri & ASN to population, the proportion of TNI, Polri & ASN to the area, and the completeness of regional defense facilities. The stability dimension relates to local conditions related to the economy, politics, education, and citizen perceptions to defend the country. These variables are operationalized using objective data modes such as city statistics (IDI, IPM, IBN, and other official indexes of Indonesian government agencies) and subjective data modes such as surveys and focus group discussions. The subjective data modes include questions related to the perception of the economy, politics and leadership, social/cultural/community factors, the environment, law enforcement apparatus, and the benefits of regional defense facilities. The table provides a comprehensive framework for operationalizing the UDI model and measuring a city's security and stability.

Table 4: Operationalization of the UDI Model

TDOC	POSTURE	STABILITY
Definition		
Threats, Disruptions, Obstacles, Challenges	The readiness of state apparatus and facilities to manage risks	Local conditions related to economy, politics, education, and citizen perception to defend the country
Objective data modes (MO)		
Number of crimes and types of crimes	The ratio of TNI, Polri & ASN to population, the proportion of TNI, Polri & ASN to the area, completeness of regional defense facilities (prison, court, Polri facilities, TNI facilities, hospitals)	City statistics: IDI (democracy index), IPM (human development index), IBN (Indek Bela Negara/citizen index to defend the country), other official indexes of Indonesian government agencies
Subjective data modes (MS)		
Survey & FGD (Schaefer & Mazerolle, 2018):	Survey & FGD (Archer & Dodman, 2015; Levianto et al., 2021; Zeimpekis et al., 2015):	Survey & FGD (Cleary, 2006; Omar et al., 2021; Sevin, 2014):
1. Is the number of crimes worrying the community?	1. Is the more police, the safer?	1. What is the perception of the economy?
2. Are the types of crime multiplying?	2. Is the more TNI, the safer?	2. How does the perception towards politics and leadership?
3. Is crime more frequent?	3. How often does a person meet officials?	3. How does the perception towards social/cultural/ community factors?
4. Are more and more criminals being jailed?	4. How often do people report security-related incidents to the security forces?	4. How does the perception of the environment affect city branding efforts?
5. Is there any other risk perception in the region?	5. What benefits do people get from regional defense facilities (prisons, courts, Polri facilities, TNI facilities, housing complexes, Etc.)?	5. How does the perception of law enforcement apparatus affect city branding?

The result of PCA for the Case Study

We use PCA (Principal Component Analysis) to find the coefficients of the formula; see equation (1). Table 4 shows the Principal Component Analysis approach of 345 respondents. It offers a strong correlation between the three variables; therefore, we did not reduce the dimensions. Thus, we only look at the cumulative portion of the loadings and make it the component weight of the subjective measurement results of MS mode. Furthermore, using aggregation, we produce objective measurements (MO). We transform the MO aggregation result on scales 1-5. Then, we discussed the result in the final FGD. As a note, the MO aggregation is based on the index of democracy (IDI), human development index (IPM), the ratio of government apparatus (TNI, police, and ASN) to population, the density of government apparatus, and logistics & defense security facilities.

Table 5: PCA Result (N= 345, Computed using: Ordinary Correlational)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	2.593066	2.297901	0.8644	2.593066	0.8644
2	0.295165	0.183397	0.0984	2.888231	0.9627
3	0.111769	---	0.0373	3.000000	1.0000
Eigenvectors (loadings):					
	PC 1	**PC 2**	**PC 3**		
TDOC	0.554092	0.830286	0.060060		
POSTURE	0.586204	-0.440394	0.680013		
STABILITY	0.591056	-0.341582	-0.730736		
Ordinary correlations:					
	TDOC	**POSTURE**	**STABILITY**		
TDOC	1.000000				
POSTURE	0.738893	1.000000			
STABILITY	0.760609	0.887307	1.000000		

We have equations (2) to (5) below by the proportions and the normalized component's coefficients.

$$MS = 0.8644*PC1 + 0.0984*PC2 + 0.0373*PC3 \quad (2)$$

$$PC1 = 0.32*TDOC + 0.339*POSTURE + 0.3414*STABILITY \quad (3)$$

$$PC2 = 0.515*TDOC - 0.273*POSTURE - 0.212*STABILITY \quad (4)$$

$$PC3 = 0.041*TDOC + 0.462*POSTURE - 0.497*STABILITY \quad (5)$$

The UDI formula assumes that OBJECTIVE and SUBJECTIVE data dimensions are different, so equations (2) to (6) refer to both objective and subjective data. The UDI variable represents the Urban Defense Index calculated using the formula below.

$$UDI = Geomean(TDOC, POSTUREE, STABILITY) \quad (6)$$

Using Robust Linear Regression and referring to equation (1), we found the model coefficients α, β, and γ; see Table 6.

Urban Defense Index of Five Cities in Kalimantan

In this section, we apply the UDI Model to the Kalimantan region, which includes five cities: Balikpapan, Samarinda, Tanjung Selor, Palangkaraya, and Pontianak. We use the Robust Least Square (RLS) model because the data is not normally distributed. The best RLS model is obtained by S-estimation.

Table 6 shows the results of a Robust Least Squares model with Huber Type I Standard Errors and covariance. The dependent variable is UDI, and the independent variables are TDOC, POSTURE, and STABILITY. The method used is S-estimation with specific settings. The coefficients, standard errors, z-statistics, and p-values are shown for each independent variable. The robust statistics are also presented, including R-squared, adjusted R-squared, and scale. The non-robust statistics, such as the mean and standard deviation of the dependent variable and the sum squared residuals, are also included in the table. The model has a high R-squared value of 0.991, indicating that the independent variables explain a significant portion of the variation in the dependent variable.

Table 6: UDI Analysis Results with Robust Least Squares (S-estimation)

Method: Robust Least Squares (S-estimation)

Dependent Variable: UDI (N=345)

S settings: tuning=1.547645, breakdown=0.5, trials=200, subsmpl=3, refine=2, compare=5

Huber Type I SE & Covariance; Random number generator: rng=kn, seed=2071828432

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TDOC	0.3260	0.0004	792.3309	0.0000
POSTURE	0.3375	0.0005	631.4317	0.0000
STABILITY	0.3359	0.0006	602.4792	0.0000
Robust Statistics				
R-squared	0.9910	Adjusted R-squared		0.9910
Scale	0.0045	Deviance		2.05E-05
Rn-squared statistic	4.98E+08	Prob(Rn-squared stat.)		0.0000
Non-robust Statistics				
Mean dependent var	3.4622	S.D. dependent var		0.4414
S.E. of regression	0.0718	Residual Sum of Square		1.7635

Source: Authors

The S-estimation approach with Huber Type I standard errors and covariance provides robust estimates of the coefficients, which are less sensitive to outliers in the data than the traditional least squares method. The R-squared and the adjusted R-squared of the model is 0.991, which indicates that the model explains a large proportion of the variation in the dependent variable and the number of independent variables in the model. The scale parameter is 0.0045, representing the estimated scale of the error distribution, and the Deviance is 2.05E-05, meaning the model's goodness of fit. Lastly, the Rn-squared statistic is a robust measure of the model's goodness of fit, which is less sensitive to outliers than the traditional R-squared. The p-value associated with the Rn-squared statistic is 0.0000, which indicates that the model is statistically significant.

Table 7 presents the final summary of the Urban Defense Index (UDI) for five cities in Kalimantan, along with the values of the independent variables, Stability, Posture, and TDOC, and the estimated coefficients of the model, α, β, and γ.

The UDI values range from 3.01 to 3.88, with Balikpapan having the highest UDI and Pontianak having the lowest UDI. These results suggest that Balikpapan has a higher level of

urban defense readiness than the other cities in the sample, while Pontianak has the lowest level of preparedness. One possible explanation for this lower level of UDI in Pontianak could be that the province of West Kalimantan, where Pontianak is located, shares a maritime border with neighboring countries in the South China Sea. The tension and disputes over the maritime border with neighboring countries in the South China Sea may cause the residents of Pontianak to perceive a sense of insecurity and vulnerability – the reason that matches (Binder, 2017). This perception of insecurity may impact various aspects of urban life, including tourism, investment, and daily activities. For example, tourists may be less likely to visit the city if they perceive it as an unsafe destination, which can negatively affect the local economy.

Table 7: Urban Defense Index in Five Cities of Kalimantan

CITIES	UDI	TDOC	POSTURE	STABILITY	α	β	γ
BALIKPAPAN	3.88	3.95	3.87	3.84	0.326	0.338	0.336
SAMARINDA	3.21	3.24	3.21	3.20	0.318	0.347	0.335
TANJUNG SELOR	3.73	3.78	3.74	3.71	0.322	0.334	0.343
PALANGKARAYA	3.24	3.17	3.34	3.22	0.335	0.324	0.340
PONTIANAK	3.01	2.69	3.05	3.21	0.361	0.334	0.307
KALIMANTAN	3.45	3.42	3.48	3.48	0.326	0.337	0.336

Source: Authors

Furthermore, the disputes may also affect the city's preparedness to respond to potential security threats. In the event of a security incident, such as a terrorist attack or a maritime accident, the city's emergency response capabilities may be tested, and the effectiveness of its defense mechanisms may be evaluated. As a result, the respondents in Pontianak may have higher expectations for the level of urban defense readiness, given the perceived security challenges in the region. The independent variables, Stability, Posture, and TDOC, all have positive coefficients, which indicates that higher values of these variables are associated with higher UDI values. Stability has the highest coefficient value among these variables, followed by Posture and TDOC. This result supports Pyroh et al. (2019), who suggest that some cities are more stable. The estimated coefficients, α, β, and γ, represent the contribution of each independent variable to the UDI. The average coefficient values suggest that Posture and Stability immensely contribute to the UDI, followed by TDOC.

The UDI results for the five cities in Kalimantan can be used as valuable input in the city branding process. City branding refers to creating and promoting a positive image of a town, aiming to attract investment, tourism, and talent. The UDI results can provide insights into the level of urban defense readiness in each city, which can be an essential consideration for investors, tourists, and potential residents. For example, a city with a high UDI value can be marketed as a safe and secure destination, attracting more tourists and investors. On the other hand, a city with a low UDI value may be perceived as less safe and secure, which can deter investment and tourism. Cró et al. (2020) found that hospitality managers should consider security a strategic issue. Trueman et al. (2007) suggest that city branding programs focusing on the periphery can be unsuccessful because they create negative perceptions of the city. This is relevant to our research question, as poor perceptions of safety can lead to unsuccessful city branding programs. Therefore, Zhang & Zhao (2009) enforce the need for in-depth research on the relationship between perceptions of safety and security on the effectiveness of city branding programs.

Overall, the UDI results can provide important insights into the level of urban defense readiness in each city, which can be a crucial consideration in the city branding process. By leveraging these insights, cities can enhance their image and attractiveness and thus promote economic growth and development.

Conclusion

The UDI model proposes three categories of factors: TDOC, Posture, and Stability, which provide a comprehensive and systematic approach to evaluating a region's ability to manage risks and handle security threats in urban areas. The model's operationalization includes objective and subjective measurements, providing a holistic view of the region's urban defense readiness.

Based on the analysis of the Urban Defense Index (UDI) for five cities in Kalimantan, it can be concluded that the UDI provides a valuable security benchmark concept that can be used for city branding in Indonesia. The UDI measures the level of urban defense readiness, an important aspect of urban security, and can be used to evaluate and compare the preparedness of different cities.

The results of the UDI analysis in the five cities' case of Kalimantan suggest that stability, posture, and TDOC are essential factors in determining the level of urban defense readiness in the cities. These factors can be used to formulate a security benchmark concept that can be incorporated into the city branding process. By emphasizing urban defense readiness in the branding message, cities can create a positive image of safety and security, attracting investors, tourists, and potential residents.

However, it is essential to note that the UDI is not a comprehensive measure of urban security. Other factors, such as crime rates, natural disaster risks, and social cohesion, should also be considered in formulating a security benchmark concept for city branding. Furthermore, acquiring a security benchmark concept should consider each city's unique characteristics and challenges, as well as the preferences and expectations of the target audience.

In summary, the UDI provides a valuable security benchmark concept that can be used for city branding in Indonesia. Still, it should be complemented with other urban security measures and tailored to each city's specific context and needs.

Future research directions can address some limitations of this study's proposed Urban Defense Index (UDI) model. Further validation and refinement of the UDI model in different regions and countries can help overcome the limitation of its limited application to only five cities in Kalimantan. The UDI model can also be expanded to include other factors that affect urban security, such as natural disasters and terrorism, and incorporate advanced analytical techniques, such as machine learning and big data analytics. Integrating the UDI model with other city branding initiatives, such as environmental sustainability and cultural heritage preservation, can also create a more comprehensive and holistic branding strategy. Finally, the UDI model can guide the allocation of resources and investments in urban security and defense infrastructure to enhance a region's urban defense readiness.

Declarations

Conflict of Interests

There are no conflicts of interest.

Availability of Data and Materials

Data is available upon request.

Author's Contribution

The first author: research conceptualization, data analysis, writing the manuscript. Second author: data collection and analysis. Third author: Literature review and writing the manuscript. Fourth author: Writing manuscript.

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