The Informality of Urban Kampungs in Jakarta: A Model of an Architectural Form

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Abstract

Urban Kampungs as part of the informal sector are different from the formal urban fabric. Although often described as uncontrolled, unplanned, and unpredictable, their forms illustrate a versatile, natural, asymmetrical, and irregular fabric in contrast to the generic architectural representations. This paper compares the relationships between kampung architecture in Jakarta. It presents the informality of kampung's fabric as an alternative model, in contrast to formal buildings. Rather than treating kampung form as a static and conventional representation, a flexible image of kampung architecture is presented to demonstrate possible simulations, transformations, and the evolution of the collective form.

The aim is to challenge the generic trend in architectural form while pushing the boundary of the conventional drawing method. The idea of kampung form is illustrated as a system, process, and shape. Experimental architectural drawing is utilized as the research method, which uses diagrams as a tool. Informality highlights the notion of kampung architectural form to present a model of built form derived from its local architecture. The adopted research steps are: 1) diagram experimentation, 2) layout calculation, 3) quantitative and qualitative comparison. The finding of this research is a representation of forms that are dynamic, flexible, and organic rather than static, rigid, and limited, emphasizing the co-relation between kampung architecture and its site. Finally, a formula is offered to understand the informality of urban kampungs in Jakarta as an alternative model.

Keywords: architecture, form, informal, kampung, urban.

Introduction

Since 1970, almost 25% of the land in Jakarta has been converted to industrial, commercial, and residential developments (Alzamil, 2017) resulting in the capital city of Indonesia having less undeveloped space by approximately 60% after the millennium (Budiarto, 2005). Despite the fact that more land has been transferred from agriculture and wetland to urban uses, Jakarta's urban sprawl has intensified with increased density in the urban core. These transformations also contribute to massive problems, such as informal settlements, traffic congestion, widespread flooding and lack of waste management service (Bowo & Koeberle, 2010). Rapid urbanization and population growth have resulted in a total change of

features of Jakarta. An unlimited number of the gated communities have emerged, large, continuously inhabited skyscrapers have arisen, and multi-lane boulevards crisscross through the city (Dehaene & Cauter, 2008). However, the urban *kampungs* have always remained the most prominent aspect of Indonesian cities.

In the last 5 years in Jakarta, 50% of the land has been claimed as unregistered. Of these, 20-30% are urban *kampungs* (Shirleyana, et al., 2018), with 360 *kampungs* classified as informal settlements since 2000 (Alzamil, 2017). With such a number, there is a question of *kampung's* compliance with planning regulations and basic living standards. With a focus on modern planning procedures, *kampungs* are often hastily labeled as lacking basic service infrastructure. Its architecture is categorized as spontaneous, unauthorized, unplanned, illegal, or as squatter settlements (Dovey, 2013) rather than explored for the qualities of their informality (Shaw & Hudson, 2009). Although various *Kampung* Improvement Programs (KIP) have successfully improved their conditions under the modern planning procedures, some may have lost their originality in the process (Shirleyana, et al., 2018). Other programs are also likely to destroy their natural order and social structure. Moreover, they are criticized as lacking any scaling-up strategies.

As only a few researchers have observed the informal quality of *kampungs*, they tend to be judged as not complying with the requirements of health, environment, ventilation, lighting, and especially building regulations (Shirleyana, et al., 2018). A local perspective is required to promote a fair understanding based on the spatial logic derived from both formal requirements and *kampung's* wisdom (Alberti, 2017). The observations of physical conditions of *kampungs* often refer to a lack of many aspects such as construction safety, construction materials, building heights, access to clean water supply, electricity, and sewage systems in accordance with the modern standards. It is frequently suggested that *kampungs* are inadequate as housing and do not satisfy human rights (Bawole, et al., 2020). These also contribute to prejudices that both *kampungs* and villages are generally poor or simply traditional. Therefore, the objective of this paper is to investigate their spatial qualities by looking at their architecture as a potency, contrasting other researches that characterize *kampungs* as urban pathology especially in Jakarta.

Literature Review

According to a historical study, Jakarta as the prominent port once posed as a magnet for occupation and income yet still valid in today's situation. Initiated by the port of Sunda Kelapa at Batavia, North Jakarta *kampung* was once denser, prone to fire and flood yet neglected by the colonial government. *Kampung* Kebun Kacang at central Jakarta was known as the area of migrants. With the large plot of lands surrounded by agriculture, squatters and indigenous villages were gradually absorbed into the broadening city, while family accelerated the growth of settlers. For decades *kampung* has been understood in a derogative way, labeled as a disorganized and relatively problematic space, suggested to be fixed through city beautification projects. Despite being repeatedly called a slum, *kampung* exhibits a distinctive feature and showing its aesthetic value. Unlike most formal architecture, *kampung* architecture is ephemeral yet demonstrating fluidity caused by the intertwined physical, social and economic actions. The feature of *kampung* is exhibited by various forms, produced by the diversity, dynamic and resourceful nature of *kampung* into a conception. Two aspects are regularly affiliated with the development of *kampung*: sites and infrastructure (Irawaty, 2018). While the site is correlated with the void, unlegalized field for flexible activities, infrastructure functions as the connection for delivery. These influence the development of the kampung space as a result of adaptation through the unit of accommodation as well as the system of relationships.

Sihombing once presented comparison research between Jakarta's old and younger *kampungs*. The old settlement is represented by *kampung* Ambon, Bali, Rambutan, Melayu and Makasar at city center (Sihombing, 2004), while younger *kampungs* are sampled by Blok Asin, Kebon Kosong, Pejagalan, Menteng Atas and Manggarai. Both have indicated physical, social, cultural, and economic logics, reflected through the map (Sihombing, 2014). Lanes and streets are significant for defining *kampungs* space, including its position and orientation in the city.

Alike, Alzamil specified *kampung* as a different type of urban fabric in comparison with formal ones. *Kampung* aggregate illustrates a growing feature and is similar in model and pattern of connection sampled by *kampung* Bandan, Luar Batang, and Muara Baru at Central and North Jakarta (Alzamil, 2017). Putri and Herlily explained the distinction logic behind the *kampung* feature. By using *kampung* Muka, North Jakarta as a case, the feature according to the study is generated by its architectural form. It is a result of spatial adaptation, influenced by economic and communal activities that are reflected by the house type and infrastructure (Putri & Herlily, 2020). The investigation suggests a concentration on the size, grain, type, and boundary of *kampung* to understand the relationship between *kampung* and its city.

Funo once questioned the distinctive feature of *kampung* Luar Batang, North Jakarta. The experiment suggests *kampung* formation is highly determined by the influx of a population despite history and socio-cultural impacts. Occupation causes resident mobility and stimulates *kampung* development. *Kampung's* feature is distinguished by the form of its type, constructed based on the articulation of their interior spaces and indicating close resemblance. *Kampung* is not built according to a predetermined plan, it shapes evolved through additions and alteration. Despite varied, *kampung* house is typical and presumably similar in Jakarta yet other major cities in Indonesia (Funo, et al., 2005). Similarly, Ashadi believes that the formation of *kampung* Luar Batang is initiated by activity that later contributes to the more sustainable function as an urban space. Function shapes the development of containers, resulting in a semi-permanent architectural form before giving meaning to society (Ashadi, et al., 2017). Puspitasari added that *kampung* potentially serves a greater scale in the urban environment as exhibiting a relationship between its architectural form and the morphological urban fabric. *Kampung* Luar Batang once served as a model, a graphical abstraction of the information to understand a symbiosis through a conceptualization of modeling. A model potentially illustrates the idea of form that reflects on a morphological space of a city. (Puspitasari, et al., 2012).

Mulyasari supplied stronger evidence by presenting *kampung* Ngarek situated at the city's periphery as a result of the struggle towards city capital power. According to the study, there are similarities between *kampung* in the city as well as at the perimeter because Jakarta is regionally connected to Bogor, Tangerang, and Bekasi. Both physical and economic power contributes to the existence of informal architecture, while its transformation lies in the vortex growth. *Kampung* configuration can be symbolically explained, while volume can be calculated through a systematic analysis based on its connection to the region (Mulyasari, et al., 2017). Puspitasari agreed that communal activities trigger a function in a particular space then later developing its networks as a system in a city. The consistent growth of *kampung* is stimulated by commercials and generating a pattern. *Kampung's* adaptation to topography and land formation together with ethnic hybridization and cultural acculturation has contributed to the habitual process towards semi-permanent accommodation in an urban area. Through formation, patterns become steadier and giving influence to the urban space (Puspitasari, et al., 2012). Although unstable physical changes occur in form and morphology, this happens because of the contradiction between traditional and modern investments that influence the instability of population profile. Fluctuation stimulates perpetual changes and contributes to the idea of growing. Interconnected links and layers of activities like trading, migration, colonialization, and industrialization have built a uniqueness as an urban fabric of Southeast Asia (Puspitasari, et al., 2012).

A tie between typology and urban tissue transformation was once presented by Funo by showing the typicality of *kampung* houses type in Indonesian towns. According to the study, *kampung* size is varied from less than 20 to more than 200 square meters, exhibiting similar form and feature associated with another *kampung* and village. It has an autonomous community model despite exhibiting various expressions of ethnic groups. Transformation may lead to understanding prototype as well as urban renewal system, revealing its formation as a whole through the analysis of typology. Relationships between different types are vital to reveal their transformation process as type variation can be reduced to extract its basic principle. By using *kampung* Kedung Doro, Surabaya, and Luar Batang, Jakarta, the study exhibits a similar characteristic, physical formation, and building construction despite being located in different

cities. It also presents structure correlation and resemblance in terms of formation. Despite lacking to presenting bigger samples and integrating various cases, the study reminds the importance of the width and length calculation that generally highlights the form characteristic of *kampung* house. It emphasizes a common spatial unit's coverage that controls the flexibility of its development. Converting units into percentages explains compositional relationships. The study highlights that the distribution of houses in *kampung* just seems chaotic but presenting a stable system and composition. The variation as a result of the housing process can be explained as simple variants of particular types (Funo, et al., 2002). Furthermore, the space formation in *kampung* only seems amorphous at the beginning, once multiple layers have been exposed the process relies on meeting changing needs of the inhabitants through a resulting transformation that contributes to the spatial dynamics of *kampung.*

Although a myriad of vernacular cases has been investigated, Rashid admitted the dilemma, especially if it lacks sufficient archaeological resources, literary evidence, and epigraphic record. In the case of understanding a gigantic scale of vernacular features, prioritizing layout is vital, despite being limited to provide the basic information or maybe unrelated with existing history. Focusing on architectural form through a layout by using virtual reconstruction means the operator may convert quantitative and qualitative data into reality. The layout presents a geometrical relationship, thus dimensional manifestation explains its feature by its basic component (Ariffin, et al., 2013). Nnaemeka offers an improved method for investigating design scale. To measure a complex unit and its natural context means to generate a trend and performance-oriented database from cross-case comparison: 1) preliminaries: aim, identification, and appraisal, 2) standardization, literature, and documentation 3) data collection, analysis, and interpretation (Nnaemeka, 2015). Although extensive, a specific analysis is required for *kampung* situated in the urban environment.

To understand its complexity, *kampung* as an urban fabric is indeed required to be analyzed qualitatively and quantitatively, presenting its natural, social, and cultural rhythm reflected in its form. By capturing *kampung* rhythm in a particular time, an actively changing or affecting growing feature in a present situation can be understood. This means following rhythmical orders and sequences presents an idea of patterns, flows both for individuals or groups of buildings including movement and flows if necessary. Rhythm is not individual, and assumedly poly while representing the whole. Various rhythms are woven together to a complex whole in a social context. It represents structures of our lives, reflecting time, cycle, and changes of everyday space. Analysis related to rhythm is called rhythmanalysis. It was initially conceptualized for investigating urban space, the everyday arena of conflicts and relations between natural, social, economic and cultural, cyclical, linear, dogmatic, dynamic, collective, outer, inner rhythms. Rhythmanalysis divides the whole into parts, from particles, genes, individuals to functions in the urban fabrics. It scrutinizes networks, flows, boundaries, zones before transforming them into form. Rhythm development reproduces norms and structure, organizing form then providing a variety of changes. Nevertheless, it depends on collectivity with precondition quantitative and qualitative aspects implemented in space. Thus, rhythm analysis is more suitable for informality and perpetual space. However, the central problem for rhythm analysis is the lack of an obvious method to document rhythm in the urban fabric, especially related to map, notation system, and the form of analysis for urban fabric. Koch once recommends a guideline from Lefevbre by elaborating the method of taking photos or film especially from above and the ground and using documentation as both a source of map and creation of new knowledge. Thus, to comprehend urban (dis)organization rhythm analysis, the study shall be concentrated on the pattern that reveals the relations between architecture, city, and its nature (Koch & Sand, 2009).

Uzunoglu advised a detailed method to understand the complexity of reality. A guideline presents a combination of physical (location, topography, pattern, climate), cultural (social, economic, political, historical, aesthetics), and technological (science, technology). According to the study, its complexity is reflected in the built environment and can be understood per component. The built environment can be investigated through its architecture as it is built based on form, function, and construction. A systematical analysis leads to finding

and regulating the component for creating both urban and rural areas. A combined method of deductive thinking for the general provision and inductive for extracting the main idea suggests rational thinking. To understand the type, forming is an expression and transmission tool to understand the logic of the composition by remodeling the built environment defined as space, mass, and surface. By focusing on model visualization, forming explains iconically, pragmatically, analogically, and canonically the relationship between architecture and its context. As a model, topological order as a simple geometry of the built environment explains the location of figures and objects according to limit and continuity while classifying their function. Later similarities-differences, proximity-contiguity, and coverage-separation explain parts to come together as a whole complex, highlights on the model are listed as followed: 1) collective form or groups, 2) repetition for principle format, 3) coverage area for exhibiting closeness 4) interferences, combination that form characteristic, 5) division and relationship, 6) ground and figure, 7) direction series, orientation. The development of a system is reflected in the shapes to reform the space and to formulate principles and meaning, criticizing individuality to emphasize grouping, incomplete figures to comprehend the gap, units to understand the form, and constellation to interpret position (Uzunoglu & Uzunoglu, 2011). Thus, the study explains the natural principles of the space through its composition while presenting whole from the parts

Research Methods

This study is conducted in 5 regions of Jakarta: West Jakarta, Center Jakarta, South Jakarta, East Jakarta and North Jakarta from March 2020-June 2021. From each region, 4 random samples of *kampung* are collected to represent districts. West Jakarta is represented by *kampung* Tanjung Gedong, Kemurnian IV, Asia Baru Tanjangan and Siaga 2. Center Jakarta by Cempaka Gang III, Johar Baru V, Kayoa and Gang Mantri III. South Jakarta by Cilandak Dalam I, Mawar II, Meninjo and Sawo Kecik I. East Jakarta by Al Karomah, Masjid IV, Damai and Melati. North Jakarta by Bakti VI, Gading Sengon V, Lorong IV and Permata X. A total number of 20 samples of *kampung* parcel are tabulated as a comparison.

Data is collected by extracting the most actual Jakarta map by using Quantum Geographic Information System (QGIS) 3.18.1 with GRASS 7.8.5, redrawn by using Autodesk Autocad 2017 inspired by Rashid virtual reconstruction method. Improving Nnaemeka suggestion, the extraction is combined and validated by using the last 5 years' official data provided by Jakarta.go.id and openstreetmap.id, cross-checked by using Jakarta map 2020, the university Jakarta map collection, and the *kampung* UNTAR map actualized by Tri Putra Bhakti on 4 April 2020. A limited observation has been conducted in Tanjung Gedong in March 2020, verifying the actualization of the data through photography and actual measurement.

The research object is the layout of the *kampung* parcel. The investigation focuses on the silhouette for representing the site and building blocks. While form is investigated qualitatively to present the type, the shape is scrutinized quantitatively as a unit. The dialectic relationship between solid and void is presented as a whole composition. Hence, following guidelines from Uzunoglu, the tabulation presents a compilation of extraction as followed: site coverage area, number of buildings, site orientation, building orientation, dominant type, recessive type, solid, void, module, and unit variation.

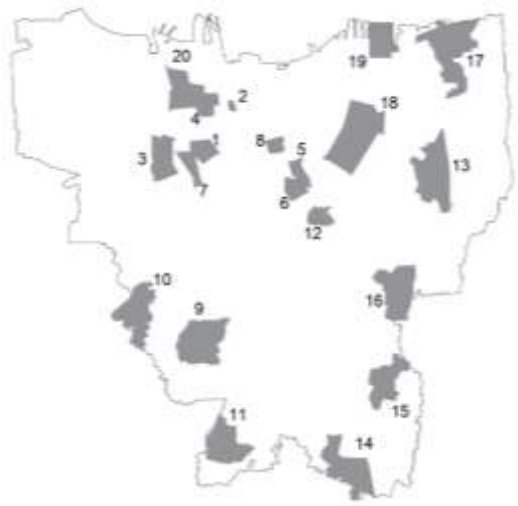
A mixed model of qualitative and quantitative methods is utilized for scrutinizing the Jakarta *kampung* form reflected on its architectural layout as a case study. The qualitative study focuses on describing the quality of the building type, form, and silhouette presented as inductive by using text analysis. A quantitative study presents a hypothetical deductive informal rhythm in Jakarta in the form of isolation of operationally defined variables by using numbers and calculation on the shape of the layout presented as statistical analysis. Both studies can also be used to verify any deviation or alienation in comparison to the formal procedure.

Results and Discussion

To investigate the quality of informality in Jakarta kampung and the relationship between architectural form and urban tissue, data verification is conducted by comparing electronic documents via Geographic Information System. A more actual and comprehensive research sample is validated by combining mapping, observation, and third-party examination including scrutinizing one of *kampung* sample layouts which is Tanjung Gedong, West Jakarta. Verification and validation illustrate more than 80% similarities across resources between the last 5 years' data and actual observation in Tanjung Gedong. Across data verification, validation, and observation to a chosen sample is illustrated by Fig 1.

Fig. 1: Validation and Verification *Kampung* Tanjung Gedong, West Jakarta as a Sampel

To present a multi-dimensional *kampung* as a Jakarta case study, the verified maps as data collection are redrawn then simplified as a diagram to produce the architectural plan. The plan represents a compilation of building forms in a parcel. The study obtains the dimension of length and width to the present module, while the area is computed as a unit. Fig 2 illustrates the location across 20 *kampung* samples in Jakarta namely *kampung:* Tanjung Gedong, Kemurnian IV, Asia Baru Tanjangan, Siaga 2, Cempaka Gang III, Johar Baru V, Kayoa, Gang Mantri III, Cilandak Dalam I, Mawar II, Meninjo, Sawo Kecik I, Al Karomah, Masjid IV, Damai and Melati, Bakti VI, Gading Sengon V, Lorong IV and Permata X. In order to support the investigation, map focuses on the silhouette of the form presenting site orientation, building, dominant and recessive types. Thus, the measurement of each parcel presents site area, number of buildings, building's module, and unit can be obtained. The design engages polylines to capture rhythm. Rhythnanalysis targets shape as the representation of building gestures and relationships between forms, thus the comparison between site and number of buildings can be counted via tabulation. As an integrated map, orientation is measured by angular dimension, the building form is scrutinized mathematically, type emerges, the module is verified horizontally according to the unit type. By separating the area of the building and the site, the percentage of solid and void can be compared and contrasted.



LEGEND:			
	West Jakarta	11	Meninjo
1	Tanjung Gedong	12	Sawo Kecik
2	Kemurnian IV		East Jakarta
3	Asia Baru Tanjakan	13	Al Karomah
4	Siaga II	14	Masjid IV
	Centre Jakarta	15	Damai
5	Cempaka Gang III	16	Melati
6	Johar Baru V		North Jakarta
7	Kayoa	17	Bakti VI
8	Gang Mantri III	18	Gading Sengon V
	South Jakarta	19	Lorong IV
9	Cilandak Dalam I	20	Permata X
10	Mawar II		

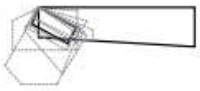
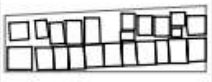
Fig 2. Location of Samples

As a collection, the tables demonstrate a variety of forms and calculations as they are interrelated, it is shown in Table 1 and Table 2. The tables feature the whole gesture of *kampung* by presenting consistent scale and proportion. A comparison between plan and layout suggests a strong similarity found throughout *kampung's* architectural form in Jakarta, despite the proximity, direction, and orientation. While variation in the collective form demonstrates viable transformation, adaptation, and evolution, architectural form proportion shows dominant modification, alteration, or conversion. The importance of co-relation between houses and their site is not only illustrated by the shape of its solidity but also by its abstract voids. As a contrast to the modern individual building designed in a closed parcel, the subtractive voids in the case of informality strongly suggest a dialectic relationship. A link is presented between houses and their surroundings as they are interlocking, interconnecting, or even intermeshing inside out. Despite presenting a myriad of unusual and unpredicted compositions, as a matter of fact, the relationship between solid and void presents a different idea of integration. It contributes a particular yet unique order to every site. When presented side by side, both built and architectural forms suggest another extended information. The correlation suggests a possible architectural shape inspiration derived from the site, a series of different fabric interpretations, orientations, and modifications despite conceiving universal modules and unit types.

There are two tables drawn for describing the informality of the Jakarta urban *kampung* as a model. The first table illustrates the shape of its architectural form through layout, while the second describes calculation and pattern extraction. The first table indicates the *kampung* collective form and its architecture as Jakarta's informality. Collective form demonstrates a representation of urban tissue exhibited by a configuration of houses. It shows the relationship between individual houses as a group while confirming each position on the site that presents an entity as a different kind of composition. The architectural form is illustrated by a layered diagram, a superimposed shape that showed by all of the individual houses in a site. All the houses have been arranged to attach to a specific point to demonstrate their dominant gesture. The architectural form diagram reflects the possibility of seeing the relationship between houses as the cells, highlighting the smallest form and the largest units from the interval. As a diagram, it provides architectural form variants, while showing the overall gesture as a pattern. As a composition, the architectural form diagram accommodates portion and material, while representing the bigness. The second table describes mathematical information based on the relationship and pattern of samples. The calculation emphasizes the physical figures of *kampung's* architecture according to the universal criteria of building typology standards. Both tables presenting a total qualitative and quantitative formula of kampung as a model.

Table 1: The Samples of Jakarta Urban *Kampung*

LOCATION		SAMPLES			
WEST JAKARTA	Parcel Layout				
	Architectural Form				
	Address	1.Tanjung Gedong Tomang Grogol	2.Kemurnian IV Glodok Taman Sari	3.Asia Baru Tanjakan Duri Kepa Kebon Jeruk	4.Siaga II Tambora Angke
CENTER JAKARTA	Parcel Layout				
	Architectural Form				
	Address	5.Cempaka Gang III Cempaka Putih Barat Cempaka Putih	6.Johar Baru V Johar Baru Johar Baru	7.Kayoa Cideng Gambir	8.Gang Mantri III Kemayoran Kemayoran

LOCATION		SAMPLES			
SOUTH JAKARTA	Parcel Layout				
	Architectural Form				
	Address	9.Cilandak Dalam I Cilandak Barat Cilandak	10.Mawar II Bintaro Pesanggrahan	11.Meninjo Ciganjur Jagakarsa	12.Sawo Kecik Bukit Duri Tebet
EAST JAKARTA	Parcel Layout				
	Architectural Form				
	Address	13.Al Karomah Cakung Barat Cakung	14.Masjid IV Cibubur Ciracas	15.Damai Bambu Apus Cipayung	16.Melati Duren Sawit Duren Sawit
NORTH JAKARTA	Parcel Layout				
	Architectural Form				
	Address	17.Bakti VI Cilincing Cilincing	18.Gading Sengon V Kelapa Gading Kelapa Gading	19.Lorong IV Koja Koja	20.Permata X Pejagalan Penjaringan
LEGEND		Built form	Site	Superlative	Interval

Source: Authors, 2021

The spatial characteristics of the overall samples of *kampung* in Jakarta show strong geometric features while suggesting organic configuration, arrangement, and order as a compound. This is supported by a comfortably calculated gesture of its architectural form, but is difficult to extract and to capture the shape, form, or even exact calculation of its void distribution. Even though its form is generally smaller and asymmetrical, it is considered a geometric standard, having a clear orientation, and highly mathematical. That is why, it is easier to postulate its individual house form, whether as a rectangular, trapezoid, square but rarely misshapen, except the void. The void is irregular, free-flowing, and uneven like the sea of the archipelago. This contributes to the perception that Jakarta's *kampung* exhibits fine-organic grains and loosely bounded aggregates, reflected in a quasi-semi parametric urban fabric in contrast to general mega-development constructed outside the *kampung*.

Table 2: The Samples Calculation based on Layout Computation.

No	Location	SA	NoB	SO	BO	DT	RT	S	V	MV	UTV
	West Jakarta										
1.	Tanjung Gedong Tomang Grogol	1,629.51	20	NW 315°	NE(10) NW(10)	R	IS	70.01	29.99	2, 3, 4, 6 8, 9 10,12 15	24, 35 56, 90 100,160 180,200 300,360
2.	Kemurnian IV Glodok Taman Sari	1,993.98	16	WNW 290°	N(11) W(5)	R	T	76.94	23.06	5, 6 8, 9 15	45, 60 90, 300
3.	Asia Baru Tanjakan Duri Kepa Kebon Jeruk	3,424.07	17	WbS 210°	NbW(12) W(5)	R	LT	49.07	50.93	3, 4 5, 6 9, 10 15,20	36, 45 60, 75 90, 145 200,300
4.	Siaga II Tambora Angke	1,869.50	26	NbE 10°	W(16) WNW(10)	T	R	74.31	25.69	3, 4 5, 6 9, 10 12,15	21, 27 36, 40 50, 60 75, 90
	Center Jakarta										
5.	Cempaka Gang III Cempaka Putih Barat Cempaka Putih	3,639.38	31	N 360°	W(16) N(15)	R	TT P	57.89	42.10	3, 4 5, 6 8, 10 12, 15 20	36, 45 60, 90 100,120 250
6.	Johar Baru V Johar Baru Johar Baru	2,349.36	6	NbE 10°	W(4) NNE (2)	R T	LT	52.78	47.21	3, 6 9, 10 12, 15, 20	60, 100 200,240 360
7.	Kayoa Cideng Gambir	4,077.90	18	NbW 350°	W(5) N(13)	R	T IS	61.33	38.66	6, 8 10, 12 20	60, 90 120,150
8.	Gang Mantri II Kemayoran Kemayoran	5,668.53	23	NbW 350°	W(14) WbS(9)	T P	R Sq	59.80	40.19	4, 7.5 9, 12 15, 20	60, 90 100,120 150,210 300
	South Jakarta										
9.	Cilandak Dalam I Cilandak Barat Cilandak	3,749.23	6	NbW 350°	N(4) W(2)	R	Sq	41.73	58.26	10, 12 15, 20 30	120,150 210,270 540
10.	Mawar II Bintaro Pesanggrahan	424.69	11	N 360°	W(8) N(3)	P	T L IS	40.70	59.29	2, 3 4, 5 6, 8	15, 24 36
11.	Meninjo Ciganjur Jagakarsa	2,135.70	10	NNE 20°	WNW(4) NNE(6)	R	T Sq	47.20	52.79	3, 4 8, 9 10, 12 15	60, 75 80, 150
12.	Sawo Kecik I Bukit Duri Tebet	1,256.94	8	WbN 280°	W(6) N(2)	R	Sq	80.93	19.06	5, 6 8, 9 10, 12 20, 25	60, 90 120,150 180

No	Location	SA	NoB	SO	BO	DT	RT	S	V	MV	UTV
	East Jakarta										
13.	Al Karomah Cakung Barat Cakung	2,409.53	25	SbW 190°	N(7) W(18)	R	Sq T	68.50	31.49	3, 4 5, 8 9, 10 12, 15	24, 36 48, 54 60, 90 100,120
14.	Masjid IV Cibubur Ciracas	3,464.56	10	SbyW 190°	NEbN(9) NWbW(1)	T	IS	73.68	26.31	5, 7.5 8, 10 15, 20 25, 50	90, 100 150,275 300,500 750
15.	Damai Bambu Apus Cipayung	2,781.68	10	WNW 290°	NbE(8) W(2)	T	LT IS	53.44	46.55	3, 4 6, 8 9, 10 12, 15	90, 120 150,160 180,200
16.	Melati Duren Sawit Duren Sawit	7,316.46	48	SSW 200°	WbN(25) NbE(23)	T	LT R	54.30	45.69	3, 4 5, 6 8, 10 12, 20 36, 50	30, 45 50, 60 90, 100 120,240 500
	North Jakarta										
17.	Bakti VI Cilincing Cilincing	2,184.78	30	SSE 160°	WSW(19) NNW(11)	T	LT IS	70.11	29.88	3, 4 5, 6 8, 9 10, 12 15, 18	15, 18 21, 24 36, 45 54, 60 100,160
18.	Gading SengonV Kelapa Gading Kelapa Gading	7,212.17	37	SE 135°	N/NE(22) W/NW(15)	T	R LT TT	49.54	50.45	2, 3 4, 6 7.5, 8 10, 12 15, 20	36, 45 50, 75 90, 100 120,150 175,250 300
19.	Lorong IV Koja Koja	5,461.68	40	W 270°	WNW(25) NNE(15)	R	IS Sq T	63.40	36.59	3, 4 5, 6 7.5, 9 12, 24	21, 36 45, 54 60, 75 100,120 175
20.	Permata X Pejagalan Penjaringan	6,690.81	23	NbyW 350°	N(3) WbS(20)	T	R Sq	62.54	37.45	6, 8 10, 15 20	50, 150 200,210 250,300

LEGEND:

1.	No	Number	13.	P	Parallelogram
2.	Location	Street name, Sub-district, District	14.	R	Rectangular
3.	SA	Site Area (sqm)	15.	T	Trapezoid
4.	NoB	Number of Building	16.	IS	Irregular Shape
5.	SO	Site Orientation	17.	Sq	Square
6.	BO	Building Orientation (number)	18.	LT	L Type
7.	DT	Dominant Type	19.	TT	T Type
8.	RT	Recessive Type	20.	N	North
9.	S	Solid (%)	21.	S	South
10.	V	Void (%)	22.	W	West
11.	MV	Module Variation	23.	E	East
12	UTV	Unit Type Variation	24.	b	by

Source: Authors, 2021

Overall information expresses a total number of 20 samples taken from different regions in Jakarta. The range of the site area is varied from 424.69 sqm to 7,316.46 sqm, the average site area is calculated as 3,487.023 sqm. The number of buildings calculated from the sample shows variation from 6-48 blocks, with the average is 21 buildings. Site orientation is dominated by North as approximately 50%, followed by the South and West as much as about 25%. The majority of the buildings face North and West directions. Dominant types found in the samples are rectangular and trapezoid shapes, while the recessive type is presented generally by l-type, t-type, perfect square, and irregular shape. The percentage of solid is varied from 40.70 % to 80.93%, with an average of 60.41%. The void is varied from 19.06% to 59.29% with an average is 39.58%. Common modules found in Jakarta's informality are 3, 4, 5, 6, 10, 12, 15, and 20 m. While common unit types, constructed in the informal area are 36, 45, 90, 120, and 150 sqm.

The general pattern suggests a common variation that represents a general informal characteristic found in Jakarta. West Jakarta has a site area under 2000 sqm, the number of buildings is approximately 20 blocks per parcel. Site orientation is North or West, with major building orientation, is North. The dominant type is rectangular. Solid-void proportion is 70%:30%, with the common module is 3, 4, 5, 6, 9 m, while general unit types are 15, 36, 60, 90 sqm. Center Jakarta illustrates various coverage site areas and several buildings. However, the common site orientation is North, while the building orientation is West. The solid-void proportion is 60%:40%, dominant type is rectangular. The common module is 3, 4, 6, 10, 12, 15 and 20 m. Despite presenting variation in terms of the site area and several numbers of buildings in a parcel, East Jakarta illustrates South as general site orientation and North as common building orientation. The dominant type is a trapezoid, while the recessive type is l-type and irregular shapes. Solid-void proportion is either 60%:40% or 70%:30%, modules are 3, 4, 6, 10,12, 15 m, while unit types are 90, 100 and 120 sqm. West, Center, and East Jakarta suggest more steady proportion, gradation, and predictable calculation.

A contrasting pattern illuminates specific and unusual characteristics, taken as a highlight in the calculation. South Jakarta presents a more even variation of site coverage area with the smallest number of buildings found in the parcel. Site orientation generally faces North, while the building orientation is West. The general proportion between solid and void is almost 50%:50%. It is dominated by rectangular shapes with less square shape building has been found. Modules and unit types are considered varied. On the other hand, North Jakarta presents the largest site coverage area, followed by the greatest number of buildings found in a parcel. Site orientation is varied, while common building orientations are North and West. The dominant building type is a trapezoid, while the recessive ones are varied, such as l-type, t-type, irregular shape, and square. The general proportion between solid and void is almost 70%:30%. Common modules are 3, 4, 5, 6, 10, and 12 m, while common unit types are 36, 45, 56, 100, 120, and 150 sqm. South and North Jakarta demonstrate anomaly, unsteady, or less predictable forms of informality.

In summary, samples show general site area coverage is approximately 3,000 sqm, consisting of around 20 buildings. Site orientation is generally dominated by North-South while the building orientation is either facing North or West. Although general assumption may visualize rectangular as the dominant type, a trapezoid is also considered as much as rectangular. Common solid-void proportion is either 70%:30% or 60%:40%, and also applicable as vice versa. General modules are 3, 4, 5, and 6 m, while the common unit type is 36, 45, 60, 100 sqm, and both repetitions, regardless varied throughout Jakarta. Hence, the calculation suggests an overall even density and distribution of informal fabrics in Jakarta. It also presents an adequate composition between solid and void, regardless of illustrating irregular, asymmetrical, and organic building gestures exhibited in the collective form. Although *kampung* architecture may not be perfect as a design, informality in this sense can also be regarded as ‘a model’ and indeed ‘a style’ rather than non-compliance to the architectural standard. This is strongly supported by a rationale that despite being less precise and less repetitive, its module reflects the universality and typicality of fabrics that are surprisingly familiar with the building typology standard.

Discussion

a. Advantages and Disadvantages

As a model, the informal architecture of Jakarta suggests a more flexible, organic, and rooted pattern of local form development. The informality may present a greater relationship between solid and void by displaying integration in comparison to common individual development. Its pattern proposes finer grain, scale, proportion, and dimension as a contrast to modern planning. It proposes multi-scalarity and multi-dimensionality only if seeing both as architecture and part of the urban fabric. However, as it is built by using available resources, *kampung* architecture is considered imprecise and lacks permanency. They may present an unlimited variation of form and shapes, despite being considered as less control. *Kampung* development could be more optimistic if facilitated by a better planning and consistent

development strategy, its informality may offer greater flexibility and organicity that are beneficial as an alternative for temporal, ephemeral, and impermanent architecture development if executed wisely.

b. Limitation and Potency

While generally formal architecture is limited by physical boundaries and borders, whether represented by a fence, wall, plane, and other architectural elements, controlled by a legalized procedure and regulation, the unlimited interpretation of *kampung* space foremost requires control. This limitless characteristic can be a potency yet a problem, as the uncontrolled growth of urban *kampung* has been frequently highlighted as one of the most prominent challenges for its existence in the city. Although the future prospect lies on the formula for developing the natural characteristic of urban *kampung* to be implemented as a 'steadier' architecture, *kampung* organicity and flexibility will only be effectively and efficiently engaged if accompanied by open-minded planning and greater governance.

Conclusion

Despite being considered organic, *kampung* architecture in Jakarta presents a general pattern and fashion. Although irregular, as a 'natural' model, Jakarta informality shows a prevalent pattern. There is a similarity in terms of shape and form, despite being built by using similar modules and types. Analysis of urban *kampung* informality emphasizes a model of architectural form that is suggested by similarity found on existing kampung. The formula suggests a specific implication for the development of a new model for urban fabric in Jakarta: a site area coverage of about 3,000 sqm, consisting of approximately 20 buildings. Site orientation faces North-South while the building orientation faces North or West. Rectangular and trapezoid are considered as the dominant type with common solid-void proportions are either 70%:30% or 60%:40. Favorable modules are 3, 4, 5, and 6 m, while the common unit type is 36, 45, 60, 100 sqm.

This similarity can be found not only on a site but also between sites when compared with overall samples of Jakarta. That is why *kampung* is potentially claimed as 'the other form' of the city's architecture, especially for informal city types. Despite various levels of imprecision in terms of dimension, location, orientation, and direction, *kampung* presents a strong gesture of commonality rather than individuality in terms of architectural gesture and the dialectic relationship between solid and void as shown by its collective form. Balanced composition and proportion between solid and void suggest a greater distribution of uses between indoor and outdoor activities stimulated by the collectivity. Interlocking solids and interwoven voids propose a semi-parametric architectural gesture like an urban tapestry because of a contrast combination between *kampung* architecture that is generally dominated by geometric form, while its void is considered as free-flowing.

To retrospect with the research, more extensive experimentation shall be conducted perpetually to the context as the case study is still limited by the number of samples. A more flexible and organic architecture will be best if promoted based on the *kampung* formula, contributing a dialectic relationship between built forms while offering a greater scale of the *kampung*. A new direction of research concentrates on planning especially for developing more sustainable input may potentially offer a greater scaling-up strategy. This can be effective only if accompanied by continuous engagement and adaptable regulation to improve *kampung* architecture as an advanced urban fabric.

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The research is a theoretical investigation of urban *kampung* in Jakarta, an ongoing study of the dissertation proposal, titled: Genomic Architecture of Urban *Kampung*. *Kampung* in this paper is regarded as an Indonesian representation of the informal sector, especially in this paper for Jakarta as a study case.

Data Availability

The architectural pattern is redrawn based on official data provided by the official website of jakarta.go.id. and openstreetmap.id. The pattern is highlighted as a collection of architectural forms extracted from 20 samples extracted by using random samples. They are selected to represent parts as a whole for the informal sector in Jakarta. The silhouette is drawn, arranged respectively to understand the variation of *kampung* architecture, both as a collective form and architectural form to be formulated as a model.

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