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The geometry of kampung tambora: A typo-morphological study

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Abstract

The Kampung Tambora is a historical urban kampung located in West Jakarta. Since 2020, this kampung has been claimed as the most populous area in ASEAN, its density and irregularity have been suspected as a contribution to various environmental issues, like spatial quality, health conditions, and disasters. Density is associated with dimensions, area, type, and spatial form, including building configuration and orientation which affect accessibility, mobility, and penetration of resources into the sites. Because of its complexity, nowadays density has become one of research urgency to comprehend kampung Tambora spatial quality. To support the investigation, the research aims to study Kampung Tambora's geometry by using typology and morphology as the methodology. Genomic tabulation is utilized as an instrument to present sample quality. By concentrating on geometry, genomic architecture converts its spatial quality into architectural tabulation, recommending the character of form while highlighting its urban patterns. QGIS is used as a tool to assist in the production of:

- Mapping,
- Tabulation, and
- Geometrical extraction.

As the pattern emerges, a rule of irregularity can be formulated, thus geometry can be interpreted to improve its condition.

Keywords: Architecture; Geometry; Kampung; Tambora; Urban

1. Introduction

The phenomenon of informality in Indonesia, especially in Jakarta has raised as one of the most debatable issues regarding a poor environment [1]. Well-known as urban kampung, this Indonesian informal settlement is a typical of lower income habitation and co-exist within an urban environment. It is characterized mostly by problematic situations, like high density, lower spatial quality, yet health concerns, including prone to fire and flood. One of the most effective solutions to improve kampung conditions is reconfiguration. To initiate the process, one has to understand the concept of urban kampung, not only from a planning perspective but also from its architecture [2]. This strategy is believed to be more effective than direct city transplantation as it is less foreign and deeply rooted in its sociological philosophy.

One of the most fundamental issues in Jakarta informality cases is density. With 10,504,100 million people living in this capital city according to the 2020 census, Jakarta is continuously facing a major urban crowd. The issue is followed by a prediction of a 60% population increase in 2025, with around 25% occupying urban kampung, including Tambora [3]. Although general informal settlement cases have been proposed by a top-down solution, most of the plan presents a lack of both architectural strategies and local wisdom. In addition, less research shows a tendency to understand the

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naturalistic form of kampung architecture, resulting in alienation that requires to be improved. Unfortunately, direct transplantation has still become a popular solution for addressing kampung spatial problems, often implemented as a uniformed row house or pin-pointed kampung improvements that may not be the best solution by far. By investigating Kampung's architectural geometry, this research fills the gap between architecture and planning, using its fabric as a sample of networks. Understanding the nature of architectural genes that form a morphology in kampung, the research aims to understand the solid and void logic that shapes the kampung environment. This includes the possibility of stimulating kampung regeneration by using its architecture as the local potency.

Kampung Tambora is not only one of the most populous kampungs in Jakarta. The Jakarta map regions have also indicated Tambora as a major problematic settlement, and one of the highlighted areas in West Jakarta. Kampung Tambora presents urgency as the most crowded settlement in Jakarta, having a coverage area of 5.4 km^2 and a population of 267,375 persons. Furthermore, Tambora has been experiencing approximately a 67% population increase each year, with the previously indicated population of 49,240 persons/ km^2 in 2017 [4]. It is also complicated by several challenges like fire, flooding, and degradation. Fire case for example has emerged as one of the most difficult problem. 1471 cases have been formally recorded [5] with an average of 30-40 cases per year [6]. 4 out of 11 areas of Tambora have also been called attention as potential flooding areas, and affecting Jakarta's prime areas. Not only problems but also some potency has not been fully taken care of. Take a sample of Tambora's historic layers dated back to the 17^{th}-century transformation, there are assets and architecture that have been degraded. By having various problems and challenges, most precedent recommends shifting the research focus from merely points to lines, and inside out to connect risky area to the major infrastructure. Better accessibility, connectivity, and integration should be encouraged to stimulate greater service and help from adjacent facilities, infrastructure, and networks [5]. This strategy is regarded as a direct alternative solution to construct more openness, transparency, and collaboration between Kampung and its city.

The tendency to shift a paradigm of solving the kampung problem recommends a dramatic change. Moving from a top-down strategy initiated by planning to bottom-up architectural intervention has become trending as effective for addressing specific societies like kampung. Most local researchers suggest Jakarta to target medium scale. The reason is because the medium risk area existence is dominant. The medium risk area displays a risk of around 65.7% while the low risk is only presented as 6.5% yet high risk is only about 27.8% [4]. In Tambora, only around 10-15% is considered a high-risk area and represented by non-permanent buildings [7] while about 85% portion around Kalianyar is categorized as small-medium scale industries and situated in the quasi-semi-permanent buildings [6]. Having said that, the medium risk area shall be put as the most concerned area, though often positioned as the least prioritized concern despite having a great portion. This is why, this research aims to concentrate on a medium-scale intervention represented by a compilation of massing, networks, or infrastructure at the border as a key rather than focusing on only small-scale intervention.

2. Material and method

The methodology of this research combines typology and morphology with genomic architecture. It is intended to construct a tabulation for analyzing geometry in the form of houses as a network. This is formulated to understand the relationship between architecture form and the language of urban fabric that shapes the overall body of kampung. By using genomic architecture for dissecting the geometry of kampung, a tabulation is designed to compare and contrast 4 unique samples taken from generic 40 digital samples. The chosen samples highlight the dramatic finding in terms of mathematic, the dominancy and the recession of the kampung types. The main location is at the periphery, a strategic part of kampung that not only holds the overall morphology of kampung but also presents a transitional, conflicting yet relatively most stable area between formal and informal boundaries. The data was collected between 11 August 2023 to 5 October 2023 a combination of observation and satellite data, extracted by QGIS computation while calculated by cad.

3. Literature review

The urban fabric complexion is associated with income. In Kampung, a house is a reflection of an asset that is constructed based on the family income. The income reflects the location, proportion, and composition yet the orientation and configuration of the house. The house situation is logically related to the availability of networks, facilities, and infrastructure of the kampung that lead to the spatial quality, thus displaying the class, the risk, and the position in the kampung. In the case of Kampung Tambora, most of the house exhibits economic drivers whether acting as garment industry, start-up businesses, small traders, home industry, or services. Few are legal but mostly illegal,

taking place at a compound, some positioned as a compilation of houses to create a system of networks inside this dense, crowded, and asymmetrical urban fabric that depends on the nearby infrastructure for its distribution and delivery [3].

Despite being considered unstable and susceptible, the kampung Tambora urban fabric shows the adaptability of its shape. This character is rooted in informal social-economical production, with a dependency on circulations and nodes resulting in organic overlapping domestic programs and private-public activity [8]. To promote and stimulate the delivery of kampung the link between the above activities positions the kampung frontage becoming an extremely important part. It is ironically often neglected as people put more concern to the dramatic internal area rather than external. Inside kampung indeed exhibits an extreme density as the typical small-medium grain fabric, accommodating families or group of people. The generic landed house displays a division around 9 sqm of room or a smaller type in a row house. It has commonly 200-500 m radius to nearby daily facilities and amenities, served by a 0.5-1m alley to around 2 meters narrow street [9]. The building height is commonly formed by a housing adaptation from the original 1 story to 2-3 level added stories, resulting smaller access and communal spaces for more accommodation [7].

In the challenge of limited space in Kampung Tambora, the proportion of domestic and public zones display a general 50% and 12.5% composition. The zones are constructed by informal negotiation and may not always be separated by physical borders nor strict rules. The casual arrangement contributes a flexible bond without destroying spatial and social networks in a particular area. This means the spatial construction in Kampung Tambora is an open object for modification and transferable uses, encouraging more sociable zones and economization of the house by using home industry, family-oriented enterprises, and community engagement as the core of socio-economic activities. A house may act as a neighborhood hub formed by micro-economy and socio-culture blending, it typically grows in the domestic area. This combination of working and dwelling contributes to the optimization, activation, and exploration of limited space in, in between, and beyond parts of individual buildings as terraces, corridors even private areas with mixed private-public functions [10], thus some bestow the total economic driver to the kampung. As a divider between spaces, personal objects are often positioned as a representation of ownership, connection, and function. They determine configuration, and control of the space, yet emphasize symbolization, territorialization, or even a flexible boundary as a sign, though it may not be typical in the generic environment. Kampung exhibits different spatial characteristics from the divided, fragmented, and segmented environment, displaying more tightly knit fabrics [11]. This fact shows the different spatial concepts exhibited by Kampung Tambora, as houses in this area act as a compilation of networks if compared with the general modern system. By understanding the situation, the core of kampung Tambora lies in the house while the relationship in kampung is nurtured by the infra.

4. Results and discussion

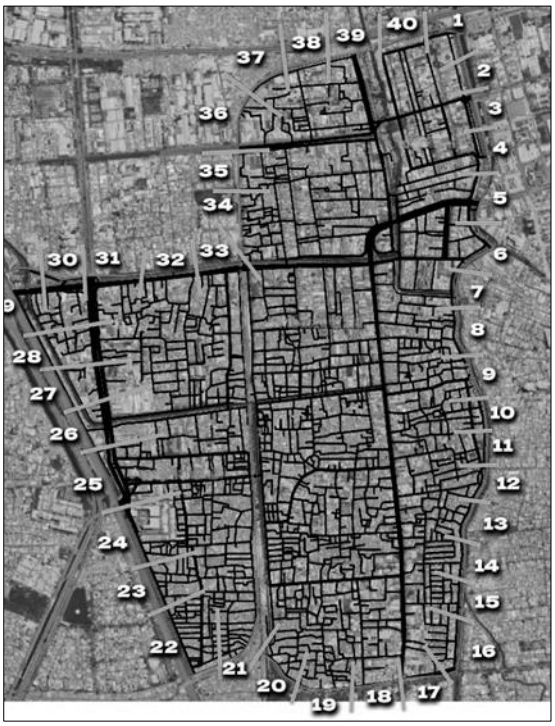

Figure 1 Networks Samples Location

There are 4 samples taken as kampung Tambora's cardinal directions, namely North, East, West and South (Image 1). Each of them is presented by order as a set of tabulations showing right and left rows respectively, while emphasizing on the gradation. The tabulation displays types, dimensions, areas, and categories to inform general morphology, variation, possibility, and character of buildings type in the network samples. Domination, recessions, comparison, and contrast are utilized as a discrepancy yet alternative that potentially recommends modification, alteration, or revision regarding the location for kampung improvements. The tabulation specifies algorithm collections as actual dimensions and units extracted to juxtapose common formal building formulation: a mirror for developing informality concepts. Hence as a compilation, the tabulations present general geometry trends in samples, while showing the unique ingredients that form typology yet shaping the overall morphology of kampung architectural border.

The North sample shows rectangular as the dominant type, while the recessive types are shown by square and trapezoid. There are variations of length from 500 cm to 2400 cm, width from 300 cm to 1100 cm, height mostly 900 cm with a variation of 500 cm, angle mostly 90° with a variation on a trapezoid, the area from 12 sqm to 216 sqm, mostly showing order composition with few disorders' variations. The general geometry composition on the North sample shows common order, symmetrical fabric with slight disorder. The rectangular is the typical architectural type that contributes various block sizes while square and trapezoid are considered atypical as rectangular variations. Although there are dimension variations, the standard module is shown as a common formula, contributing to a familiar unit's area as a result of this sampling algorithm (Table 1).

Table 1 The North: Site 38 Architectural Genomic Tabulation

	RIGHT						
NO	**BASE TYPE**	**LENGHT (cm)**	**WIDTH (cm)**	**HEIGHT (cm)**	**ANGLE**	**AREA (sqm)**	**CATEGORY**
1	Rectangular	1700	900	900	90°	153	Order
2	Rectangular	700	500	600	90°	35	Order
3	Square	700	700	600	90°	49	Order
4	Square	600	600	600	90°	36	Order
5	Rectangular	1000	600	900	90°	60	Order
6	Rectangular	700	600	900	90°	42	Order
7	Rectangular	800	500	900	90°	40	Order
8	Rectangular	700	300	900	90°	21	Order
9	Rectangular	1100	600	900	90°	66	Order
10	Rectangular	1100	700	900	90°	77	Order
11	Rectangular	1300	300	900	90°	39	Order
12	Rectangular	600	400	900	90°	24	Order
13	Rectangular	1000	700	900	90°	70	Order
14	Square	400	400	900	90°	16	Order
15	Trapezoid	600 900	500 600	900	89.58°; 86.55°; 126.31°; 57.54°	37	Disorder
16	Rectangular	800	700	900	90°	56	Order
17	Rectangular	1200	500	900	90°	60	Order
18	Rectangular	600	500	900	90°	30	Order
19	Rectangular	900	500	900	90°	45	Order
20	Rectangular	500	300	900	90°	15	Order

21	Rectangular	900	500	900	90°	45	Order
22	Rectangular	900	500	900	90°	45	Order
23	Rectangular	900	400	900	90°	36	Order
24	Rectangular	1900	400	900	90°	76	Order
25	Rectangular	900	500	900	90°	45	Order
26	Rectangular	800	600	900	90°	48	Order
27	Rectangular	500	400	900	90°	20	Order
28	Rectangular	1600	600	900	90°	96	Order
29	Rectangular	600	500	900	90°	30	Order
30	Square	1100	1100	900	90°	121	Order
31	Rectangular	1800	1100	900	90°	198	Order
32	Rectangular	900	500	900	90°	45	Order

	LEFT						
NO	**TYPE**	**LENGHT (cm)**	**WIDTH (cm)**	**HEIGHT (cm)**	**ANGLE**	**AREA (sqm)**	**CATEGORY**
A	Rectangular	1900	1400	900	90°	266	Order
B	Rectangular	700	500	900	90°	35	Order
C	Rectangular	1000	500	900	90°	50	Order
D	Rectangular	1100	600	900	90°	66	Order
E	Rectangular	1400	600	900	90°	84	Order
F	Rectangular	700	600	900	90°	42	Order
G	Rectangular	1100	500	900	90°	55	Order
H	Rectangular	600	300	900	90°	18	Order
I	Trapezoid	600 800	800 800	900	98.63°; 77.98°; 89.84°; 93.53°	56	Disorder
J	Rectangular	1100	600	900	90°	66	Order
K	Rectangular	1000	800	900	90°	80	Order
L	Rectangular	900	300	900	90°	27	Order
M	Rectangular	900	600	900	90°	54	Order
N	Rectangular	1100	400	900	90°	44	Order
O	Rectangular	900	400	900	90°	36	Order
P	Rectangular	1400	500	900	90°	70	Order
Q	Trapezoid	1400 1400	500 600	900	91.27°; 85.40°; 91.18°; 92.13°	75	Disorder
R	Rectangular	700	400	900	90°	28	Order

S	Rectangular	700	400	900	90°	28	Order
T	Rectangular	900	400	900	90°	36	Order
U	Rectangular	400	300	900	90°	12	Order
V	Rectangular	1000	300	900	90°	30	Order
W	Rectangular	1100	900	900	90°	99	Order
X	Rectangular	1400	400	900	90°	56	Order
Y	Rectangular	1000	600	900	90°	60	Order
Z	Rectangular	900	600	900	90°	54	Order
AA	Rectangular	1200	600	900	90°	72	Order
AB	Rectangular	1100	500	900	90°	55	Order
AC	Rectangular	1100	700	900	90°	77	Order
AD	Rectangular	1200	1100	900	90°	132	Order
AE	Rectangular	2400	900	900	90°	216	Order
AF	Rectangular	900	700	900	90°	63	Order

The East sample shows rectangular as the dominant type, while the recessive types are shown by trapezoid. There are variations of length from 700 cm to 2097 cm, width from 300 cm to 1500 cm, height mostly 600 cm with a variation of 300 cm and 900 cm, angle mostly 90° with a variation on trapezoid and parallelogram, the area from 21 sqm to 241.5 sqm, mostly showing order composition with few disorders' variations. The general geometry composition on the East sample shows common order, symmetrical fabric with slight disorder. The rectangular is the typical architectural type that contributes various block sizes while parallelogram and trapezoid are considered atypical as a rectangular variation. The dimension variations display improvisation of standard modules and shown as a common formula contributing a familiar unit's area as a result of this sample algorithm although resulting in a tendency of imprecision in module and unit (Table 2).

Table 2 The East: Site 7 Architectural Genomic Tabulation

	RIGHT						
NO	**TYPE**	**LENGHT (cm)**	**WIDTH (cm)**	**HEIGHT (cm)**	**ANGLE**	**AREA (sqm)**	**CATEGORY**
A	Trapezoid	2097	524	600	90°, 90°, 96°, 84°	109	Disorder
B	Rectangular	1700	800	600	90°	136	Order
C	Rectangular	700	550	600	90°	38.5	Order
D	Rectangular	1200	700	600	90°	84	Order
E	Rectangular	1100	900	900	90°	99	Order
F	Rectangular	1250	500	900	90°	62.5	Order
G	Rectangular	1745	580	600	90°	101.21	Order
H	Rectangular	1450	1400	900	90°	203	Order
I	Rectangular	1600	900	900	90°	152	Order
J	Rectangular	1050	600	900	90°	63	Order
K	Rectangular	1330	580	600	90°	77.14	Order
L	Rectangular	1010	650	300	90°	65.65	Order

M	Rectangular	1510	1130	600	90°	170.63	Order
N	Rectangular	1490	900	600	90°	138.57	Order
O	Rectangular	1610	1500	600	90°	241.5	Order
P	Rectangular	1350	800	900	90°	108	Order
Q	Rectangular	810	700	600	90°	61.56	Order
A	Trapezoid	2097	524	600	90°,90°, 96°, 84°	109	Disorder
B	Rectangular	1700	800	600	90°	136	Order
C	Rectangular	700	550	600	90°	38.5	Order
D	Rectangular	1200	700	600	90°	84	Order
E	Rectangular	1100	900	900	90°	99	Order
F	Rectangular	1250	500	900	90°	62.5	Order
G	Rectangular	1745	580	600	90°	101.21	Order
H	Rectangular	1450	1400	900	90°	203	Order
I	Rectangular	1600	900	900	90°	152	Order
J	Rectangular	1050	600	900	90°	63	Order
K	Rectangular	1330	580	600	90°	77.14	Order
L	Rectangular	1010	650	300	90°	65.65	Order
M	Rectangular	1510	1130	600	90°	170.63	Order
N	Rectangular	1490	900	600	90°	138.57	Order
O	Rectangular	1610	1500	600	90°	241.5	Order
P	Rectangular	1350	800	900	90°	108	Order
Q	Rectangular	810	700	600	90°	61.56	Order

	LEFT						
NO	**TYPE**	**LENGHT (cm)**	**WIDTH (cm)**	**HEIGHT (cm)**	**ANGLE**	**AREA (sqm)**	**CATEGORY**
1	Trapezoid	850	610	600	90°, 90°, 96°, 84°	51.85	Disorder
2	Parallelogram	890	880	600	90°, 90°, 96°, 84°	78.32	Disorder
3	Rectangular	1600	550	600	90°	88	Order
4	Rectangular	600	450	600	90°	27	Order
5	Rectangular	600	350	900	90°	21	Order
6	Rectangular	1220	1010	900	90°	123.22	Order
7	Rectangular	1010	680	600	90°	68.68	Order
8	Rectangular	650	640	900	90°	41.6	Order
9	Rectangular	700	650	900	90°	46.8	Order
	Alley		300				

10	Rectangular	1520	1100	900	90°	167.2	Order
11	Rectangular	2040	900	600	90°	185.64	Order
12	Rectangular	2040	430	300	90°	87.72	Order
13	Rectangular	2040	1010	600	90°	206.04	Order
14	Rectangular	1510	870	600	90°	131.37	Order
15	Rectangular	1510	1150	600	90°	173.65	Order
16	Rectangular	1500	890	900	90°	133.5	
17	Rectangular	1240	570	600	90°	70.68	Order
18	Rectangular	700	700	900	90°	52.5	Order

The West sample shows rectangular as the dominant type, while the recessive types are shown by trapezoid. There are variations of length from 300 cm to 2040 cm, width from 110 cm to 1140 cm, height from 300 cm with a variation of 800 cm, angle mostly 90° with a variation on a trapezoid, the area from 13 sqm to 573 sqm, mostly showing order composition with few disorders' variations. The general geometry composition on the North sample shows common order, symmetrical fabric with slight disorder. The rectangular is the typical architectural type that contributes various block sizes, while the trapezoid is considered atypical as a rectangular variation. The dimension variations display an uncommon modification of standard modules while shown as a common formula contributing a familiar unit's area as a result of this sampling algorithm although resulting in a tendency of contrast module and unit (Table 3).

Table 3 The West: Site 28 Architectural Genomic Tabulation

	RIGHT						
NO	**TYPE**	**LENGHT (cm)**	**WIDTH (cm)**	**HEIGHT (cm)**	**ANGLE**	**AREA (sqm)**	**CATEGORY**
A	Trapezoid	620 570	110 350	400	90°,70°, 90°, 90°,	13	Disorder
B	Rectangular	630	330	300	90°	21	Order
C	Rectangular	470	485	500	90°	23	Order
D	Rectangular	760	545	800	90°	41	Order
E	Rectangular	770	545	700	90°	42	Order
F	Rectangular	735	500	750	90°	37	Order
G	Rectangular	795	460	700	90°,	37	Order
H	Rectangular	425	820	800	90°	35	Order
I	Rectangular	370	194	300	90°	72	Order
J	Rectangular	590	111	400	90°	65	Order
K	Rectangular	800	460	300	90°	37	Order
	Alley	1270 470 450 1280	565 260 500 350	700	90°	109	Order
L	Rectangular	580	420	400	90°	25	Order
M	Rectangular	300	150	300	90°	43	Order
N	Rectangular	645	100	300	90°	64	Order
O	Rectangular	500	100	700	90°	50	Order

P	Rectangular	700	650	800	90°	45	Order
Q	Trapezoid	1300 880	500 275 195	300	90°,105°, 165°, 90°	573	Disorder

	LEFT						
NO	**TYPE**	**LENGHT (cm)**	**WIDTH (cm)**	**HEIGHT (cm)**	**ANGLE**	**AREA (sqm)**	**CATEGORY**
1	Rectangular	750	365	750	90°	27	Order
2	Rectangular	620	485	300	90°	30	Order
3	Rectangular	750	680	500	90°	51	Order
4	Rectangular	770	680	400	90°	52	Order
5	Rectangular	550	500	500	90°	28	Order
6	Rectangular	460	340	300	90°	16	Order
7	Rectangular	1520	350	700	90°	53	Order
8	Rectangular	1110	530	750	90°	59	Order
9	Rectangular	1040	800	400	90°	73	Order
10	Rectangular	1030	800	300	90°	82	Order
11	Rectangular	1150	970	400	90°	111	Order
12	Rectangular	1150	630	300	90°	72	Order
13	Rectangular	2040	570	500	90°	95	Order
14	Rectangular	950	340	400	90°	31	Order
15	Rectangular	1940	1140	500	90°	221	Order
16	Rectangular	550	500	500	90°	27.5	Order
17	Rectangular	700	500	300	90°	34.5	Order
18	Rectangular	1900	530	400	90°	100	Order
19	Rectangular	1870	800	500	90°	151	Order
20	Rectangular	1870	650	500	90°	121	Order
21	Rectangular	1870	560	300	90°	105.5	Order
22	Rectangular	1320	800	400	90°	105	Order

The South sample shows rectangular as the dominant type, while the recessive types are shown by T and L. There are variations of length from 470 cm to 3530 cm, width from 325 cm to 1210 cm, height mostly 600 cm with a variation of 300 cm, angle mostly 90° with a variation of L, the area from 27.22 sqm to 427.13 sqm, mostly showing order composition with few disorders' variations. The general geometry composition on the North sample shows common order, symmetrical fabric with slight disorder. The rectangular is the typical architectural type that contributes various block sizes while T and L are considered atypical as a rectangular variation. The dimension variations show an uncommon modification of standard modules while shown as a common formula contributing a familiar unit's area as a result of this sampling algorithm resulting in a tendency of both imprecision in module and unit (Table 4).

Table 4 The South: Site 20 Architectural Genomic Tabulation

	RIGHT						
NO	**TYPE**	**LENGHT(cm)**	**WIDTH(cm)**	**HEIGHT (cm)**	**ANGLE**	**AREA(sqm)**	**CATEGORY**
1	Rectangular	690	530	600	90°	36.57	Order
2	Rectangular	3530	1210	600	90°	27.13	Order
3	Rectangular	2090	755	600	90°	157.8	Order
4	T	2180	1210	600	90°	63.78	Order
5	Rectangular	470	325	300	90°	15.28	Order
6	Rectangular	1290	590	600	90°	76.11	Order
7	Rectangular	1365	670	600	90°	91.46	Order
8	Rectangular	1040	650	600	90°	67.60	Order
9	Rectangular	1540	795	600	90°	22.43	Order
10	Rectangular	450	405	600	90°	18.23	Order
11	Rectangular	620	475	600	90°	29.45	Order

	LEFT						
NO	**TYPE**	**LENGHT(cm)**	**WIDTH(cm)**	**HEIGHT(cm)**	**ANGLE**	**AREA(sqm)**	**CATEGORY**
A	Rectangular	859	600	600	90°	51.54	Order
B	Rectangular	671	651	600	90°	43.69	Order
C	Rectangular	1093	965	600	90°	05.48	Order
D	L	2980	1080	600	112°, 161° ,142°,127° ,105°, 90°	21.84	Disorder
E	Rectangular	1005	747	300	90°	75.08	Order
F	Rectangular	1592	533	600	90°	84.86	Order
G	Rectangular	840	596	600	90°	50.07	Order
H	Rectangular	584	466	600	90°	27.22	Order
I	Rectangular	1625	652	600	90°	05.95	Order
J	Rectangular	913	617	600	90°	56.34	Order
K	Rectangular	1820	690	600	90°	25.58	Order
A	Rectangular	859	600	600	90°	51.54	Order

From the above samples, the tabulations present a unique fabric. There are similarities between samples that contribute characteristics of kampung such as rectangular is presented ubiquitously at the periphery and acting as a dominant type. Rectangular generally shapes the overall kampung fabric although they are constructed in various dimension, orientation, and configuration. It is built relatively according to standard architectural modules, commonly having a general 90° angle and showing a formal order, though placed and positioned according to the infrastructure. On the other hand, there are a few different types found in the samples, namely square, trapezoid, L, and T, and considered recessive because of their rarity. Some are categorized as having formal order while the rest are built based on informal precision.

As a specific founding, from the four samples, it can be concluded that the North sample presents the most ordered sample, presenting the most generic, stable, symmetrical, and perfectly standard modules, while the South exhibits the most disordered sample as showing an uncommon modification of standard modules and a tendency of both imprecision module and unit. The gradation is shown by four samples holding general rectangular fabric form despite placed depending on the semi-organic shape of kampung infra, resulting a typology that is built based on a basic rectangular geometry, while morphology holds the semi-parametric significant based on its infra. Kampung Tambora exhibits a familiar shape, standard pattern and logical module that is commonly found in architectural field despite visually exhibit casual fashion. Every sample displays a gap or point that is considered less precise yet disordered, regardless of the overall gesture of Kampung Tambora morphology, exhibiting informal model. The all-disorder label in the tabulation is suggested as the best point for improvement, mostly to support the dominant geometrical order as the main gesture of kampung.

5. Conclusion

Kampung geometry presents a general characteristic that is shaped by a dominant architectural formal order, though the infra may contribute a fluid fashion. This contributes a semi-parametric style tendency in general morphology of Kampung Tambora, while typologically consists of dominant ununiformed rectangular architectural form built based on the direction of its infrastructure. It is best to advance the development of ununiformed rectangular row house if planner ought to emphasize kampung dominant type, while considering the other variation such as square, trapezoid, T, L and parallelogram if ought to present a uniqueness in kampung based on its recessive type. The informal geometry in Tambora exhibits a specific trace because some houses are built with less precise yet unregular construction. Having that condition, alternatively these disorder cases may also be considered as the best location for entrance, open space, renovation, revision, and improvement kampung as Tambora requires possible areas for better accessibility, porosity, and communality simultaneously at different directions. Disorder in this paper does not mean to label abnormality nor disruptive but ought to recommend a strategic place for improving untidiness or improving disorganization for stimulating a better pattern in kampung. The kampung geometry present an order gesture rather than organic manner, it is the arrangement that may be visually visible as chaotic yet unregular, and for those the overall façades may best be improved to present a proper visualization and appealing space experience.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

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