

INVESTIGATE SUSTAINABILITY ASPECT IN SPATIAL CONFIGURATIONS OF JAVANESE VERNACULAR ARCHITECTURE: CASE STUDY OF JOGLO HOUSE

G E Xian, D Novianto1*, I Defiana
*didit.novianto@its.ac.id
Institut Teknologi Sepuluh Nopember

Introduction

- Joglo houses, like Pati's, show rich cultural heritage and traditional wisdom [1-3].
- These structures, inherited across generations without formal records
- Joglo's roof design and layout, is not just a house but a cultural treasure [4-6].
- The layout of Joglo house reflects social, cultural, and philosophical values [7-8].
- The purpose of this study is to explore the spatial characteristics of Joglo house that support the sustainability.

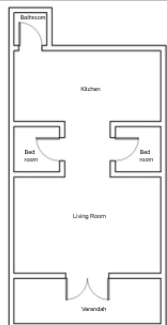
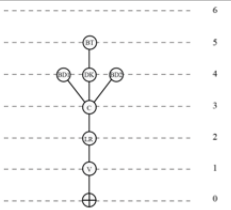
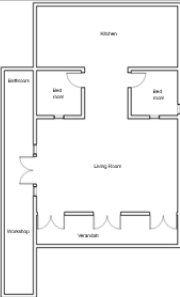
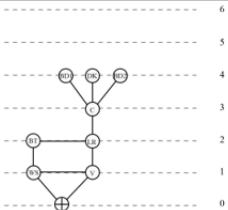
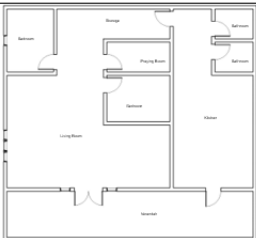
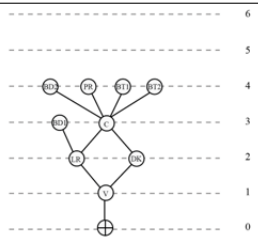
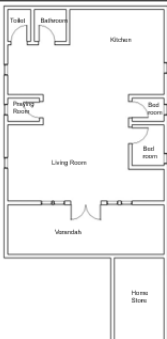
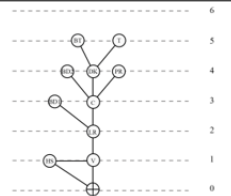
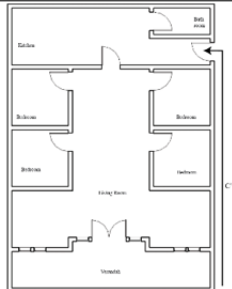
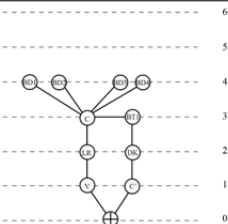


Picture 1. Pati's Joglo house.

Method

- 5 representative houses (Tabel 1).
- Using space syntax with Justified Plan Graph (JPG) analytical technique [9].
- JPG: a graphical representation where spaces are depicted as nodes and their interrelations as lines, arranged hierarchically with level 0 as the main space [10-11].

Table 1. The floorplan and the floorplan nodes of Joglo house.

Floorplan	Floorplan Nodes	Floorplan	Floorplan Nodes
A		B	
			
Floorplan		Floorplan Nodes	
C			
			
Floorplan	Floorplan Nodes	Floorplan	Floorplan Nodes
D		E	
			

Result and Discussion

Table 2. The JPG calculation of house A

A	Space	TD	MD	RA	I
0	+	23	3.28	0.76	1.31
1	V	17	2.42	0.47	2.1
2	LR	13	1.85	0.28	3.5
3	C	11	1.57	0.19	5.25
4	BD1	17	2.42	0.47	2.1
5	BD2	17	2.42	0.47	2.1
6	DK	15	2.14	0.38	2.62
7	BT	21	3	0.66	1.5
K=8	Mean	16.75	2.39	0.46	2.56

Table 3. The JPG calculation of house B

B	Space	TD	MD	RA	I
0	+	21	2.62	0.46	2.15
1	V	16	2	0.28	3.5
2	WS	20	2.5	0.42	2.33
3	BT	17	2.12	0.32	3.11
4	LR	13	1.62	0.17	5.6
5	C	14	1.75	0.21	4.66
6	BD1	21	2.62	0.46	2.15
7	DK	21	2.62	0.46	2.15
8	BD2	21	2.62	0.46	2.15
K=9	Mean	18.22	2.27	0.36	3.09

The RA value highlights spatial segregation within the spaces, revealing a significant disparity between public and private spaces [14].

The highest value of RA is shown in house A where the house has predominantly separate rooms, thus showing a higher level of spatial segregation.

Result and Discussion

Table 4. The JPG calculation of house C

C	Space	TD	MD	RA	I
0	+	27	3	0.5	2
1	V	19	2.11	0.27	3.6
2	LR	15	1.66	0.16	6
3	DK	17	1.88	0.22	4.5
4	BD1	23	2.55	0.38	2.57
5	C	13	1.44	0.11	9
6	BD2	21	2.33	0.33	3
7	PR	21	2.33	0.33	3
8	BT1	21	2.33	0.33	3
9	BT2	21	2.33	0.33	3
K=10	Mean	19.8	2.2	0.3	3.96

Table 5. The JPG calculation of house D

D	Space	TD	MD	RA	I
0	+	32	3.2	0.48	2.04
1	V	24	2.4	0.31	3.21
2	HS	32	3.2	0.48	2.04
3	LR	19	1.9	0.2	5
4	BD1	28	2.8	0.4	2.5
5	C	18	1.8	0.17	5.62
6	BD2	27	2.7	0.37	2.64
7	PR	27	2.7	0.37	2.64
8	DK	23	2.3	0.28	3.46
9	BT	32	3.2	0.48	2.04
10	T	32	3.2	0.48	2.04
K=11	Mean	26.72	2.67	0.37	3.02

- K: 8 to 13. It shows that the higher the value of K, the higher the value of the total depth that indicated the privacy of the house [12,13].
- All the floor plans show that the corridor located inside the room has the highest I value compared to other rooms. It indicates that corridor is the most integrated space [15].

Result and Discussion

Table 6. The JPG calculation of house E

E	Space	TD	MD	RA	I
1	+	37	3.08	0.37	2.64
2	V	31	2.58	0.28	3.47
3	C'	39	3.25	0.41	2.44
4	LR	25	2.08	0.19	5.07
5	MP	33	2.75	0.31	3.14
6	BD1	36	3	0.36	2.75
7	C	22	1.83	0.15	6.6
8	PR	27	2.25	0.22	4.4
9	BD2	32	2.66	0.31	3.3
10	BD3	32	2.66	0.31	3.3
11	DK	28	2.33	0.24	4.12
12	BT1	39	3.25	0.41	2.44
11	BT2	39	3.25	0.41	2.44
K=13	Mean	32.30	2.69	0.31	3.54

- House E has the highest MD, which indicates that this house has many isolated spaces. In contrast, house C has the lowest MD value, indicating fewer isolated spaces. An isolated space can be interpreted as a space that is less connected to the other spaces in the house [14].

Conclusion

The space syntax analysis, considering sustainability, shows that higher node range values in houses like House E suggest more private, isolated spaces, aligning with sustainable design principles. House A's spatial segregation reflects less integrated, separate rooms. Corridors in all houses, with high integration values, emerge as potential sustainable communal spaces due to their strategic placement

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