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==== MAPPER ANALYSIS RESULTS ====
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--- Clusterer Reliability (Probability of working) ---
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Clusterer	Finite_Count	Total_Cells	Success_Rate
hierarchical-thresh	423	980	43.163265
dbscan-tight	422	980	43.061224
dbscan-loose	386	980	39.387755
dbscan-medium	385	980	39.285714
dbscan-dense	376	980	38.367347
automato	333	980	33.979592
hierarchical	67	980	6.836735

```
--- Global Best Performing Case (Lowest Min_Value) ---
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Shape	3D_torus_R2_r0p2_S5000_x
Clusterer	dbscan-dense
eps	0.7
min_samples	8.0
Finite_Count	70
Total_Cells	70
Min_Value	0.180926
Best_Res	14.0
Best_Gain	0.1

```
--- Analyzing Distribution of Best Settings ---
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Generating bubble plot 'analysis_settings_distribution.png'...
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Top 5 most frequent optimal settings (Res, Gain) :
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Best_Res	Best_Gain	Count
14.0	0.10	25
14.0	0.20	6
12.0	0.35	3
8.0	0.10	2
5.0	0.25	2

```
--- Best & Worst Shapes per Clusterer ---
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Clusterer	Best_Shape	Best_Value	Worst_Shape	Worst_Value
automato	3D_torus_R2_r0p2_S1000_x	0.2397	3D_double_torus_R11p6_r10p9_R20p8_r20p2_S5000_x	2.2845
dbscan-dense	3D_torus_R2_r0p2_S5000_x	0.1809	3D_double_torus_R11p6_r10p9_R20p8_r20p2_S1000_x	2.3192
dbscan-loose	3D_torus_R2_r0p2_S5000_x	0.1809	3D_torus_R2_r1p7_S1000_x	0.7348
dbscan-medium	3D_torus_R2_r0p2_S5000_x	0.1809	3D_double_torus_R11p6_r10p9_R20p8_r20p2_S1000_x	2.3031
dbscan-tight	3D_torus_R2_r0p2_S5000_x	0.1809	3D_double_torus_R11p6_r10p9_R20p8_r20p2_S1000_x	2.1315
hierarchical	3D_torus_R2_r0p2_S1000_x	0.2631	3D_torus_R2_r1_S1000_x	2.1280
hierarchical-thresh	3D_torus_R2_r0p2_S5000_x	0.1809	3D_double_torus_R11p6_r10p9_R20p8_r20p2_S1000_x	2.3031

--- generating Boxplot... ---

--- Comparing Sampling Density (S1000 vs S5000) ---

Found 30 comparable pairs (Shape + Clusterer).

Cases where S5000 was better (lower distance): 14

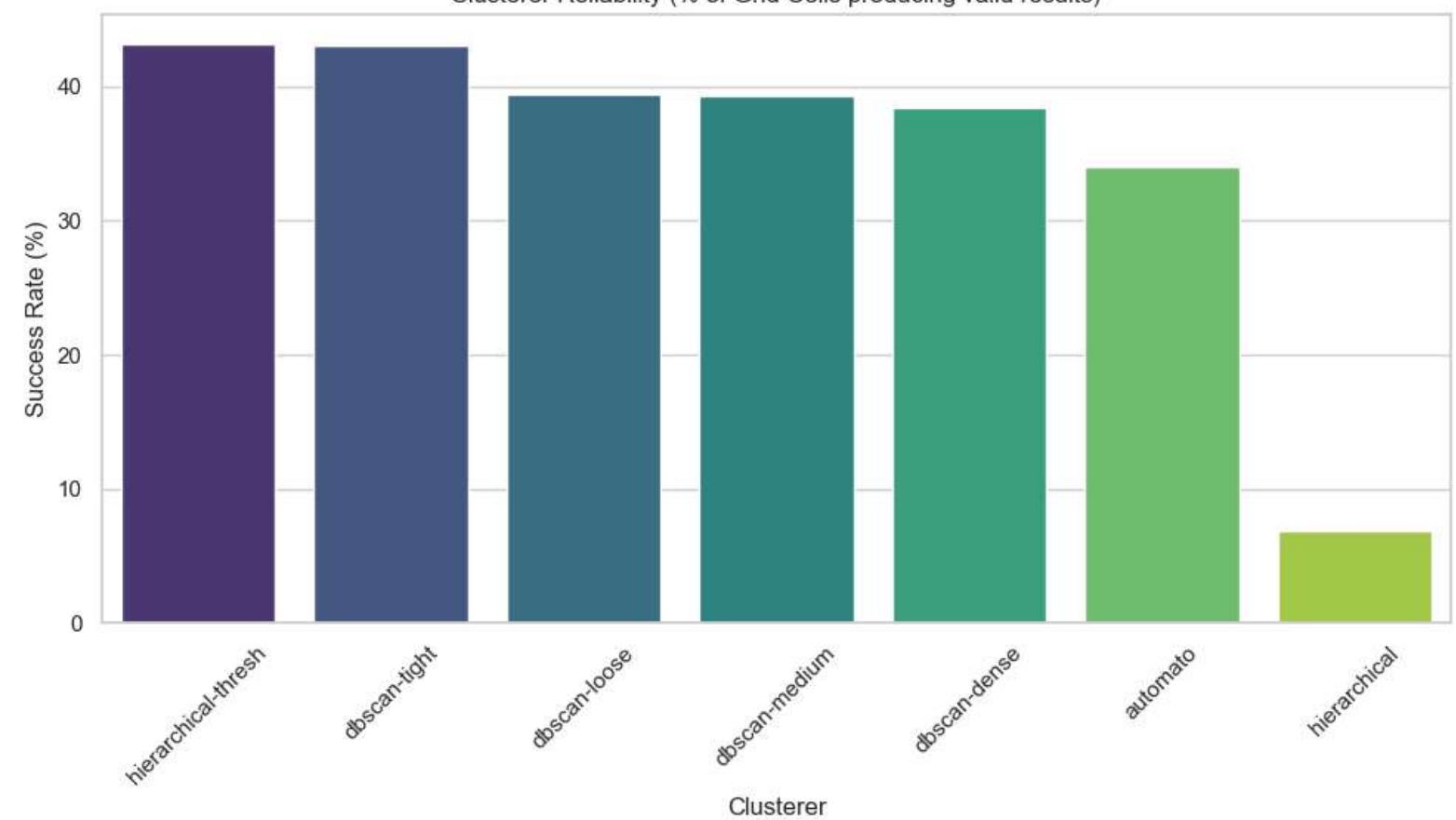
Cases where S1000 was better (lower distance): 16

Cases with identical performance: 0

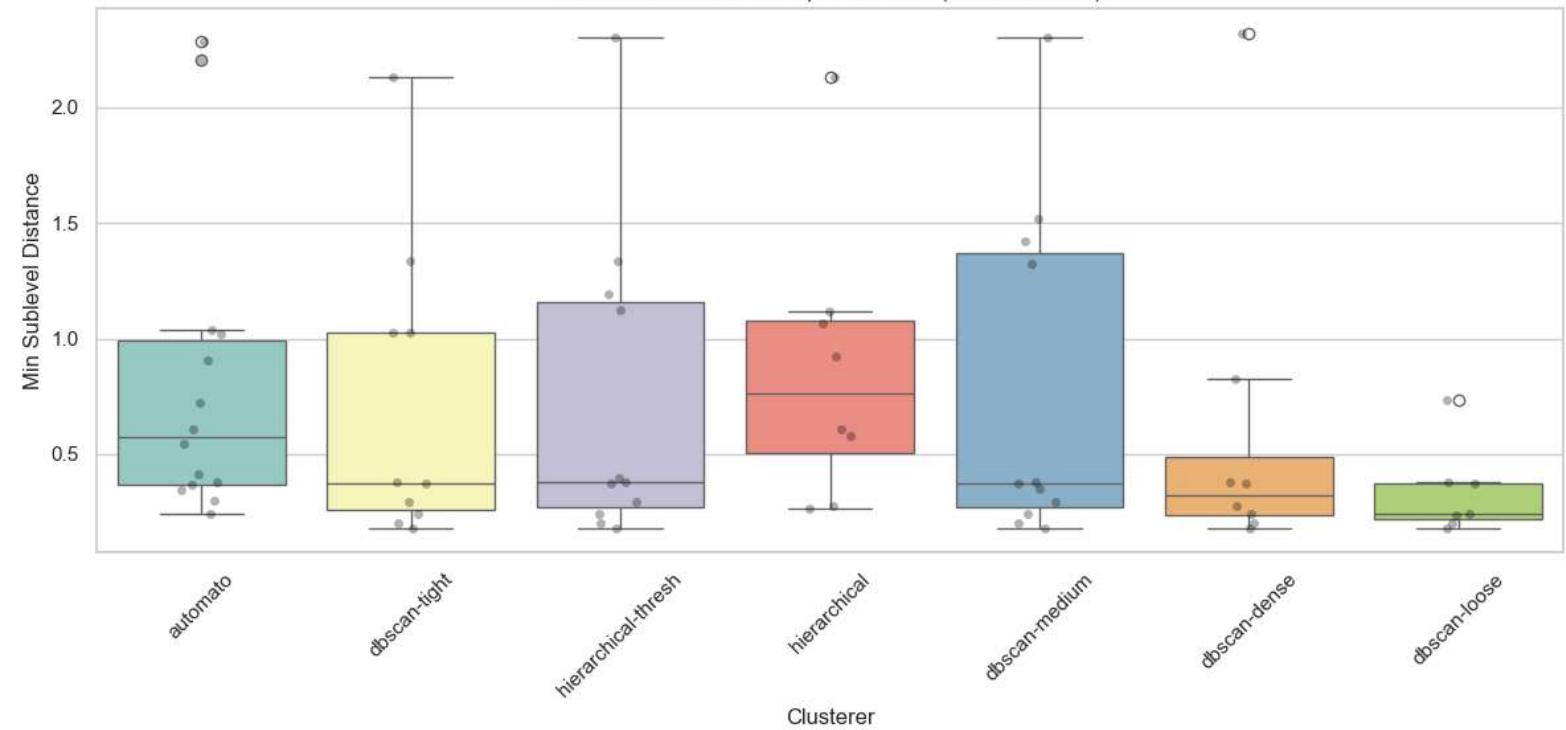
Average Improvement (Reduction in Min_Value): 0.1920

Generating comparison plot 'analysis_sampling_comparison.png'...

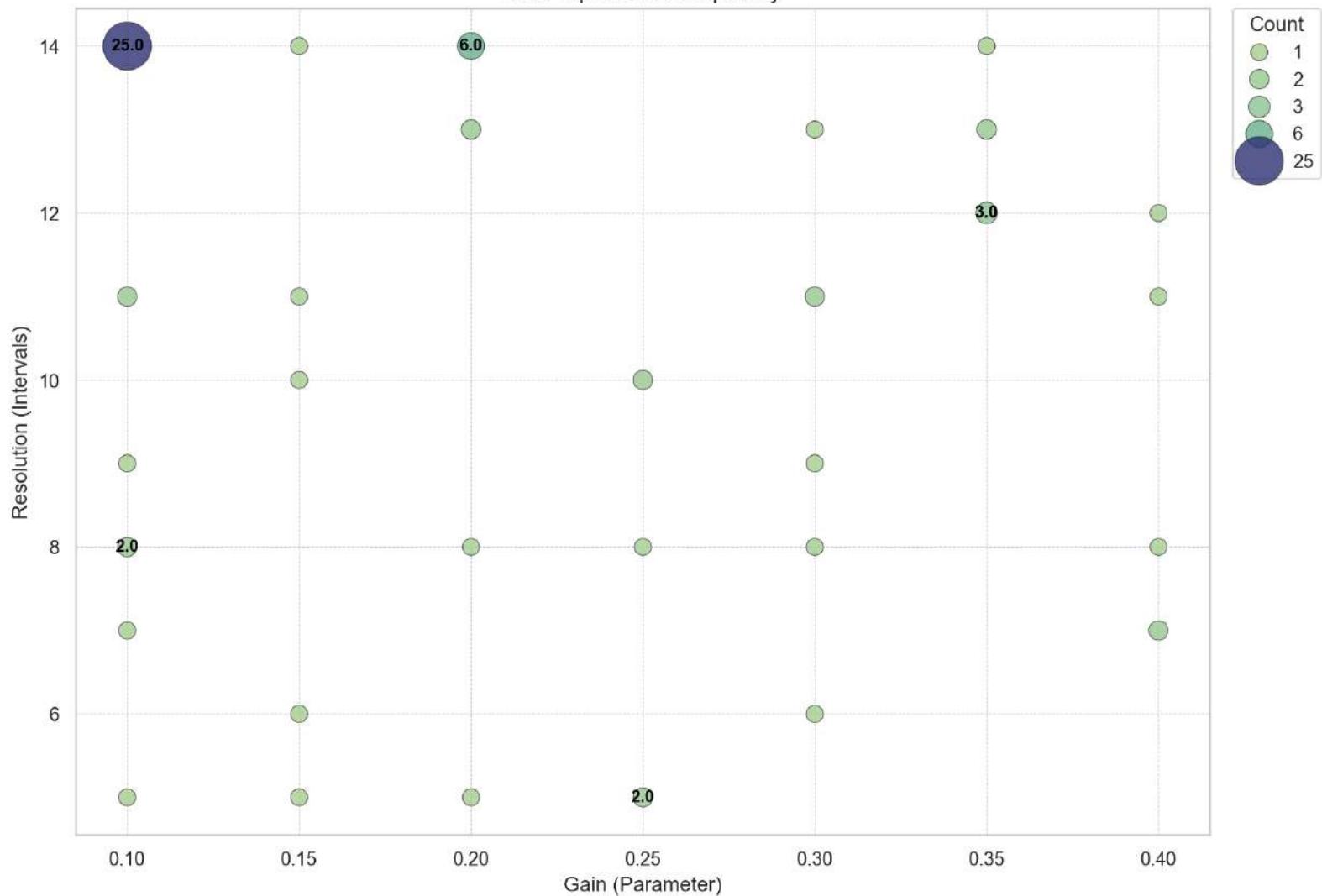
Clusterer Reliability (% of Grid Cells producing valid results)



Performance Distribution per Clusterer (Lower is Better)



Distribution of Optimal Settings (Res vs Gain)
Size represents frequency



Convergence Test: S1000 vs S5000
(Points below red line = S5000 performed better)

