Abalone Exploration

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2023-12-12

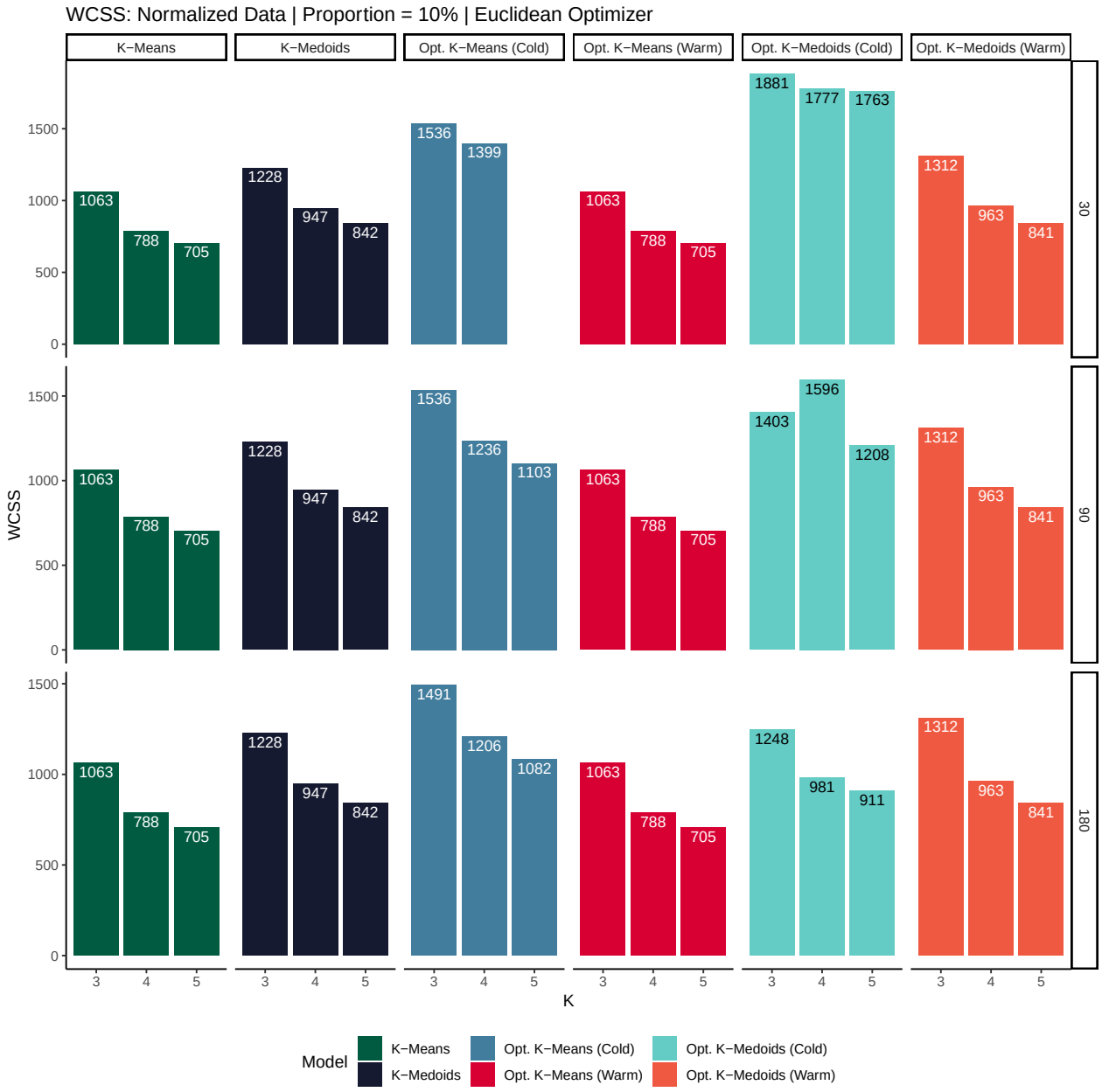
Read in Abalone Data Results

```
abalone_combined <- read_excel("./model_results/abalone_combined.xlsx")
abalone_combined <- abalone_combined %>%
                        filter(!WCSS ==  -15095.00)
abalone_combined$Model <- as.factor(abalone_combined$Model)
abalone_combined$`Time Limit` <- as.factor(abalone_combined$`Time Limit`)
abalone_combined$Proportion <- as.factor(abalone_combined$Proportion)
abalone_combined$Transformation  <- as.factor(abalone_combined$Transformation)
abalone_combined$K <- as.factor(abalone_combined$K)
abalone_combined$`Optimizer Distance` <- as.factor(abalone_combined$`Optimizer Distance`)
```

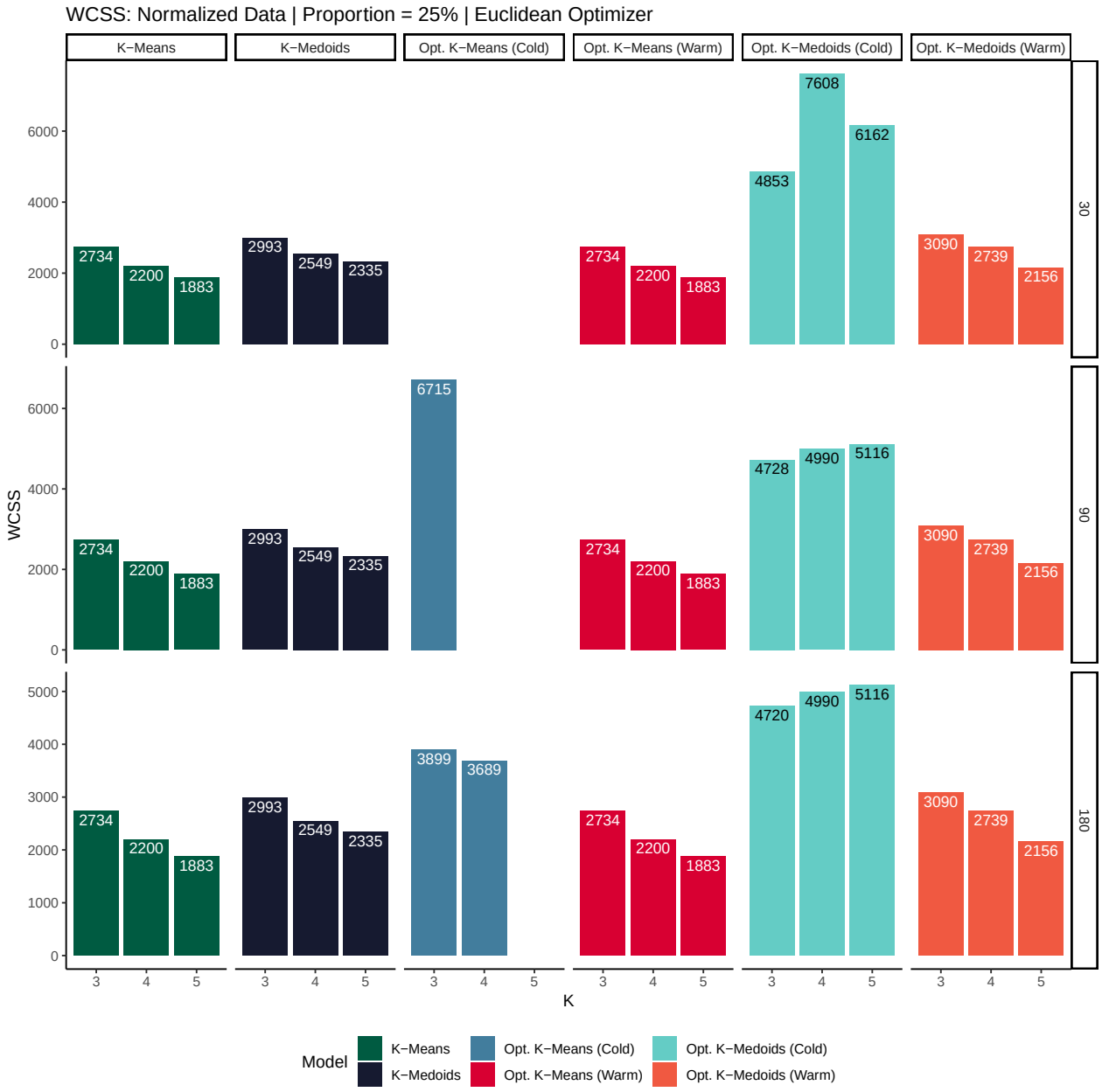
WCSS Normalized Plots:

Euclidean:

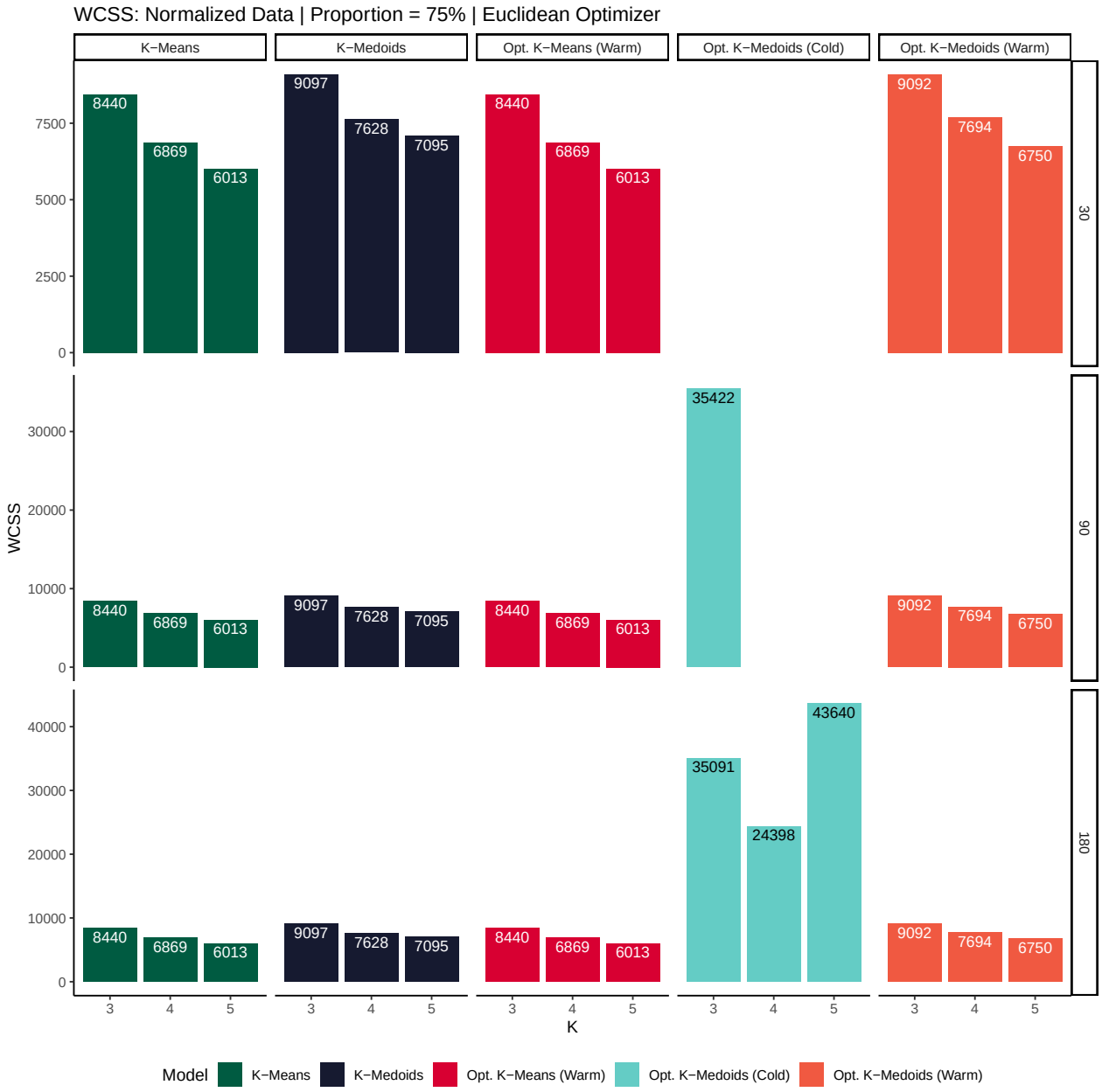
```
wcss_grouped(abalone_combined, "Normalized", 0.10, "Euclidean", y_scale="free")
```




```
wcss_grouped(abalone_combined, "Normalized", 0.25, "Euclidean", y_scale="free")
```

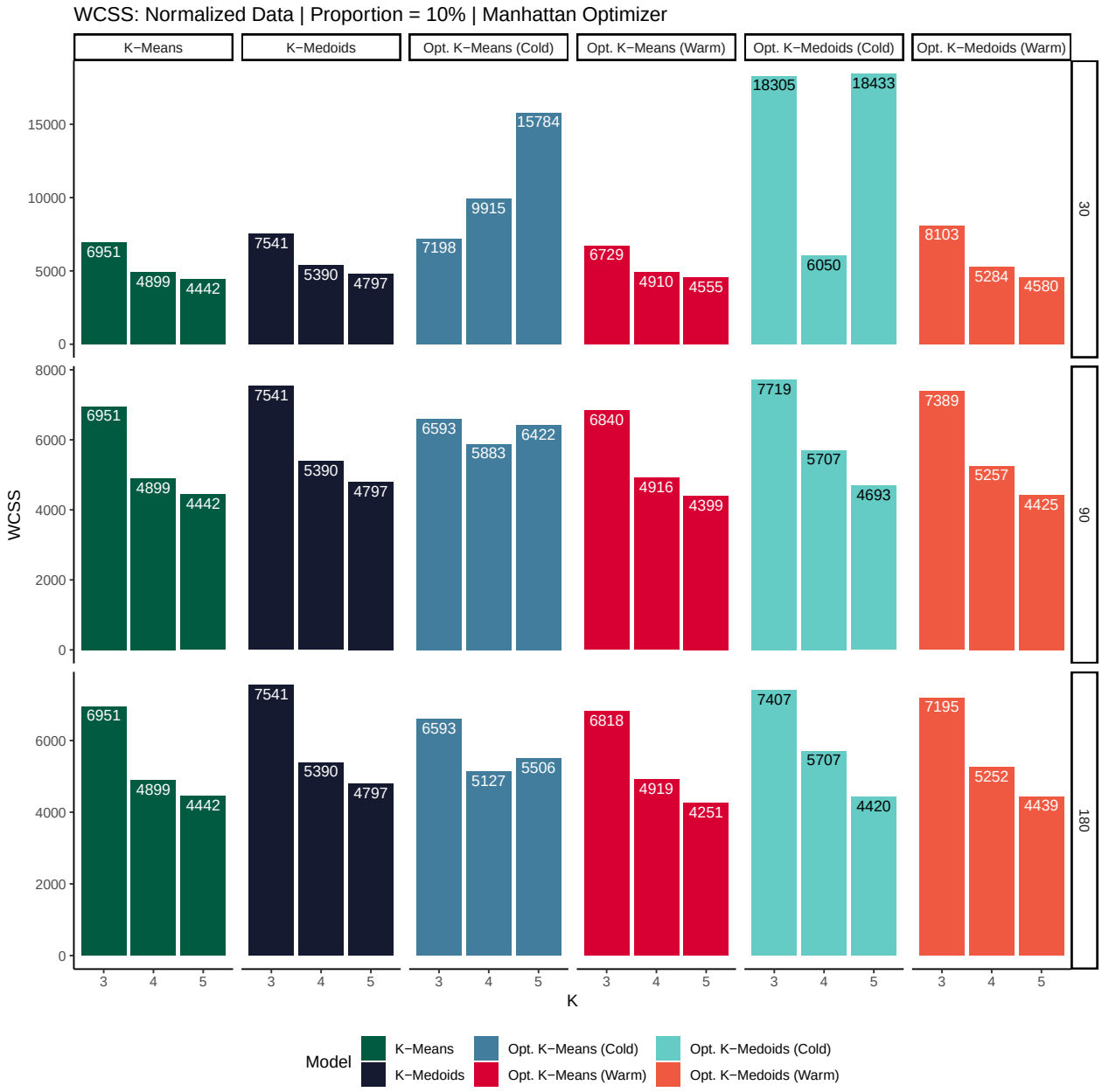



```
wcss_grouped(abalone_combined, "Normalized", 0.75, "Euclidean", y_scale="free")
```

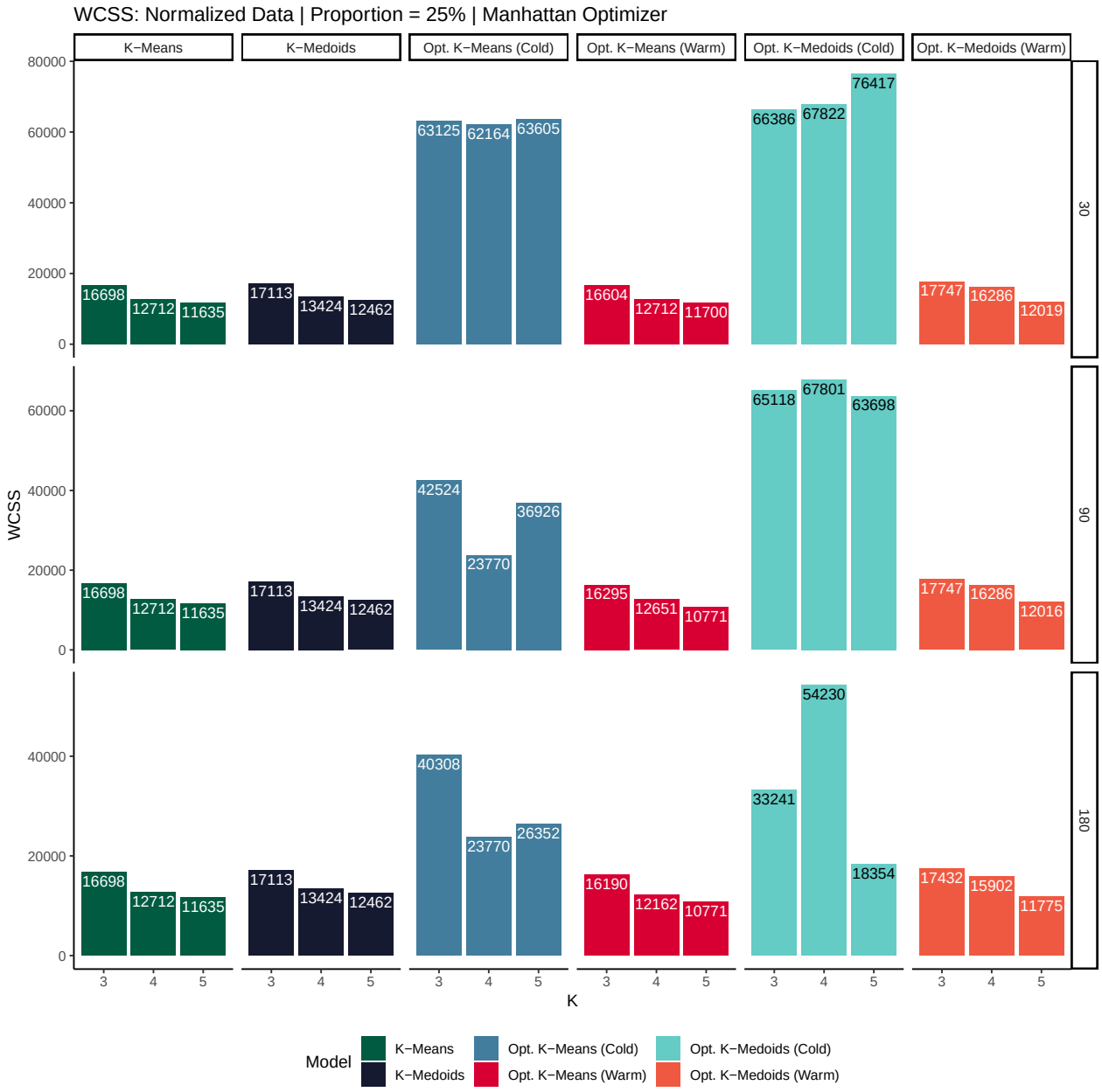


Manhattan:

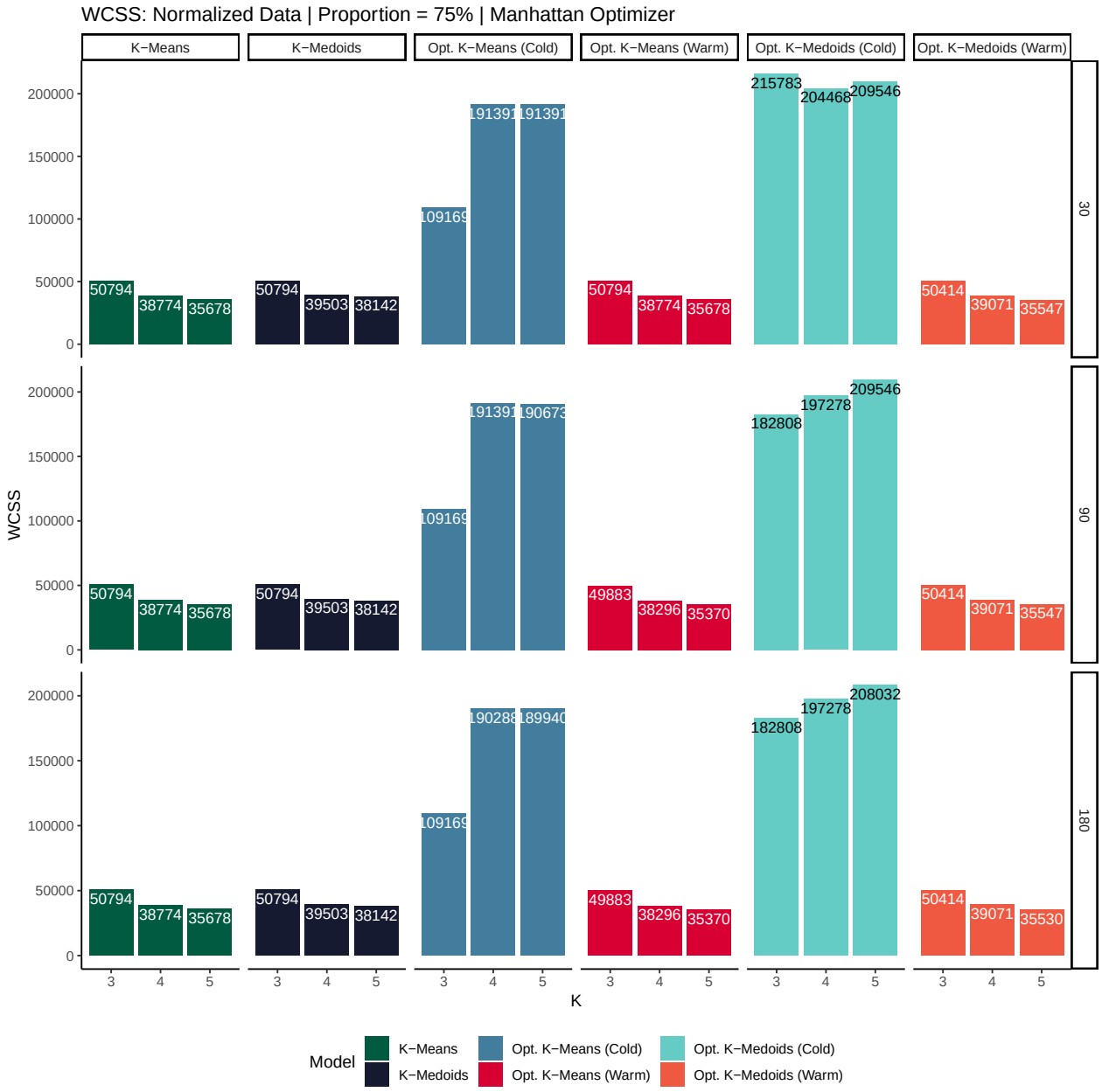
```
wcss_grouped(abalone_combined, "Normalized", 0.10, "Manhattan", y_scale="free")
```




```
wcss_grouped(abalone_combined, "Normalized", 0.25, "Manhattan", y_scale="free")
```

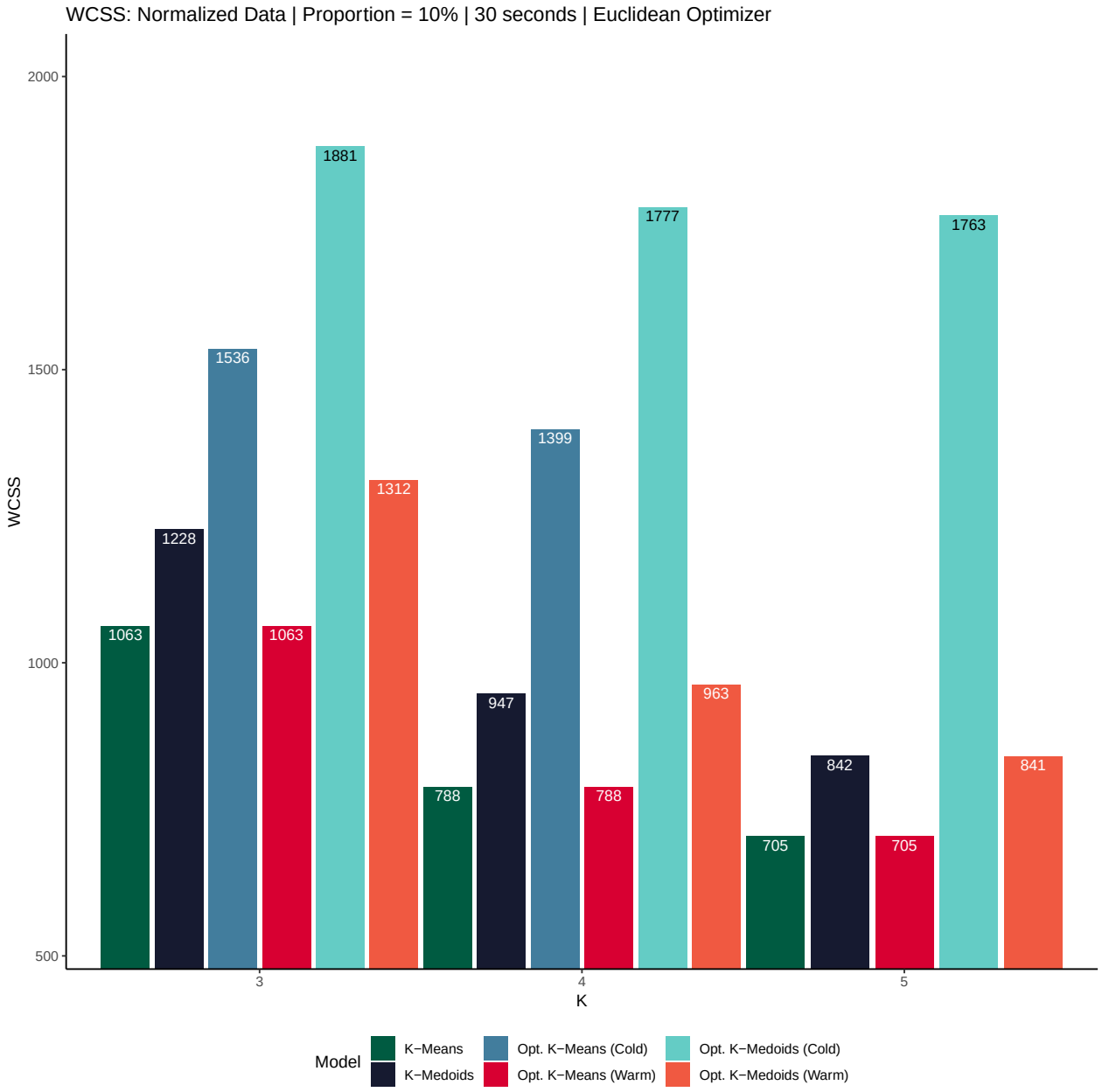



```
wcss_grouped(abalone_combined, "Normalized", 0.75, "Manhattan", y_scale="free")
```

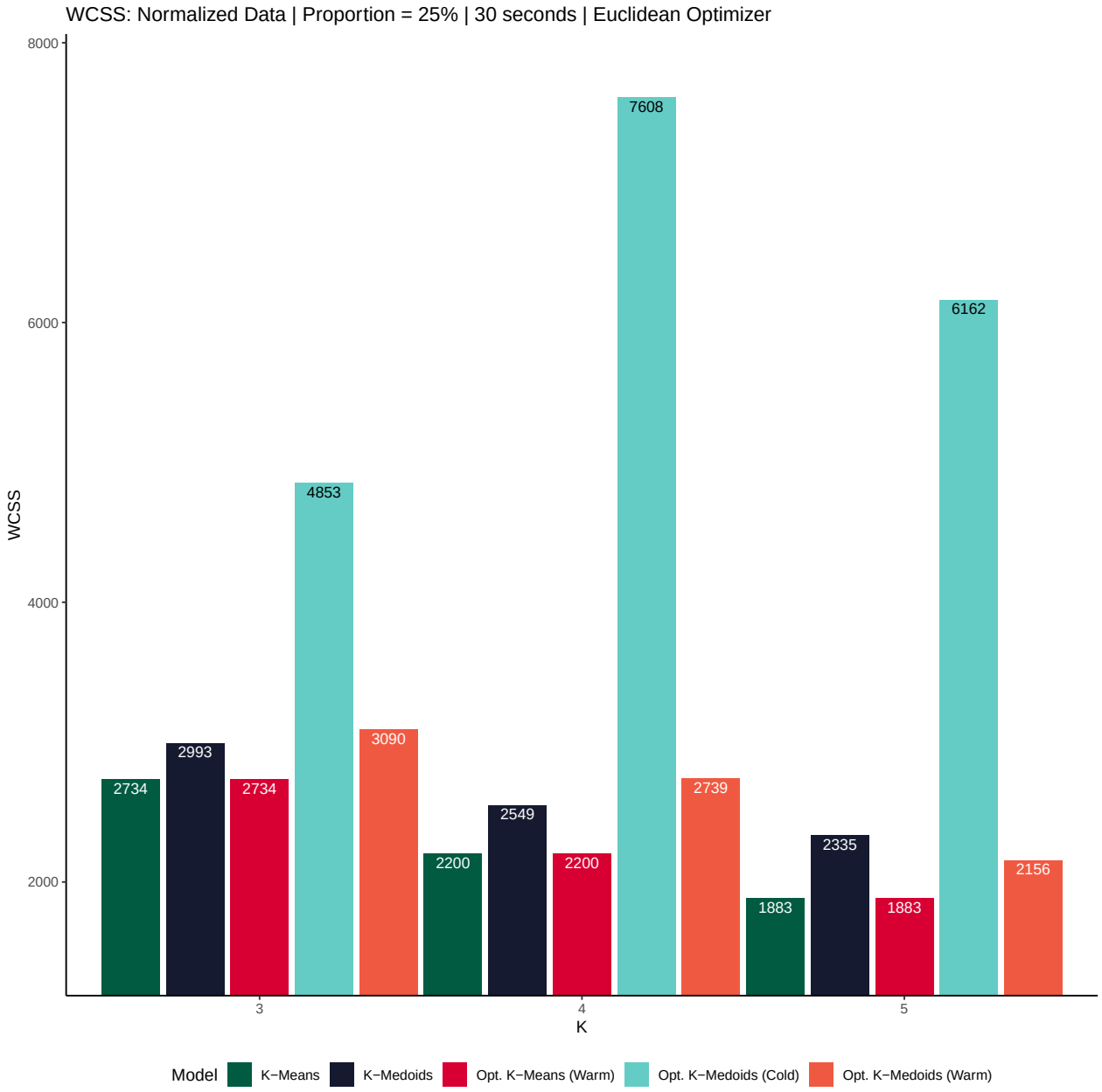


Individual Euclidean:

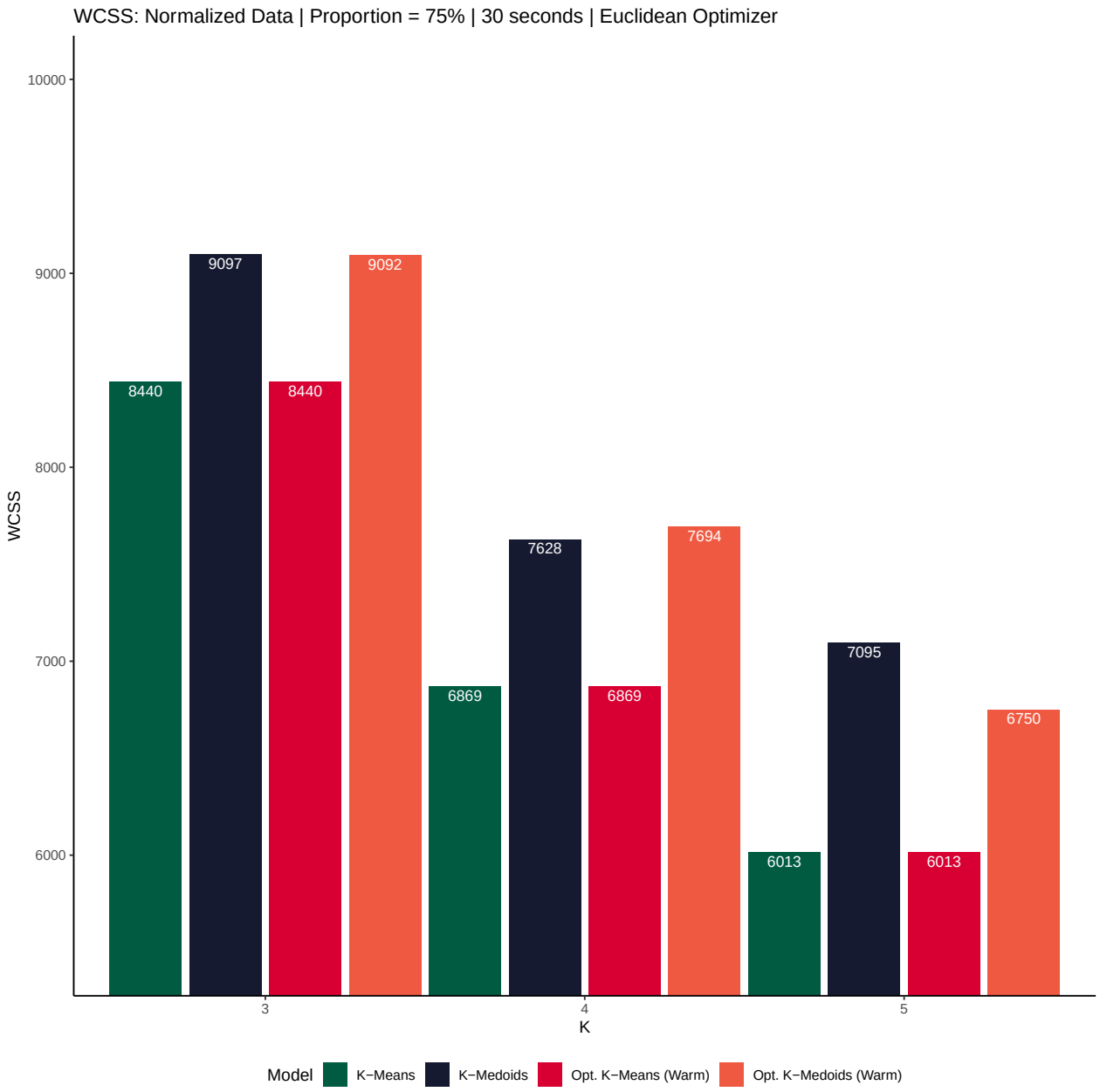
```
wcss_individual(abalone_combined, "Normalized", 0.10, "Euclidean", 30, 550, 2000)
```



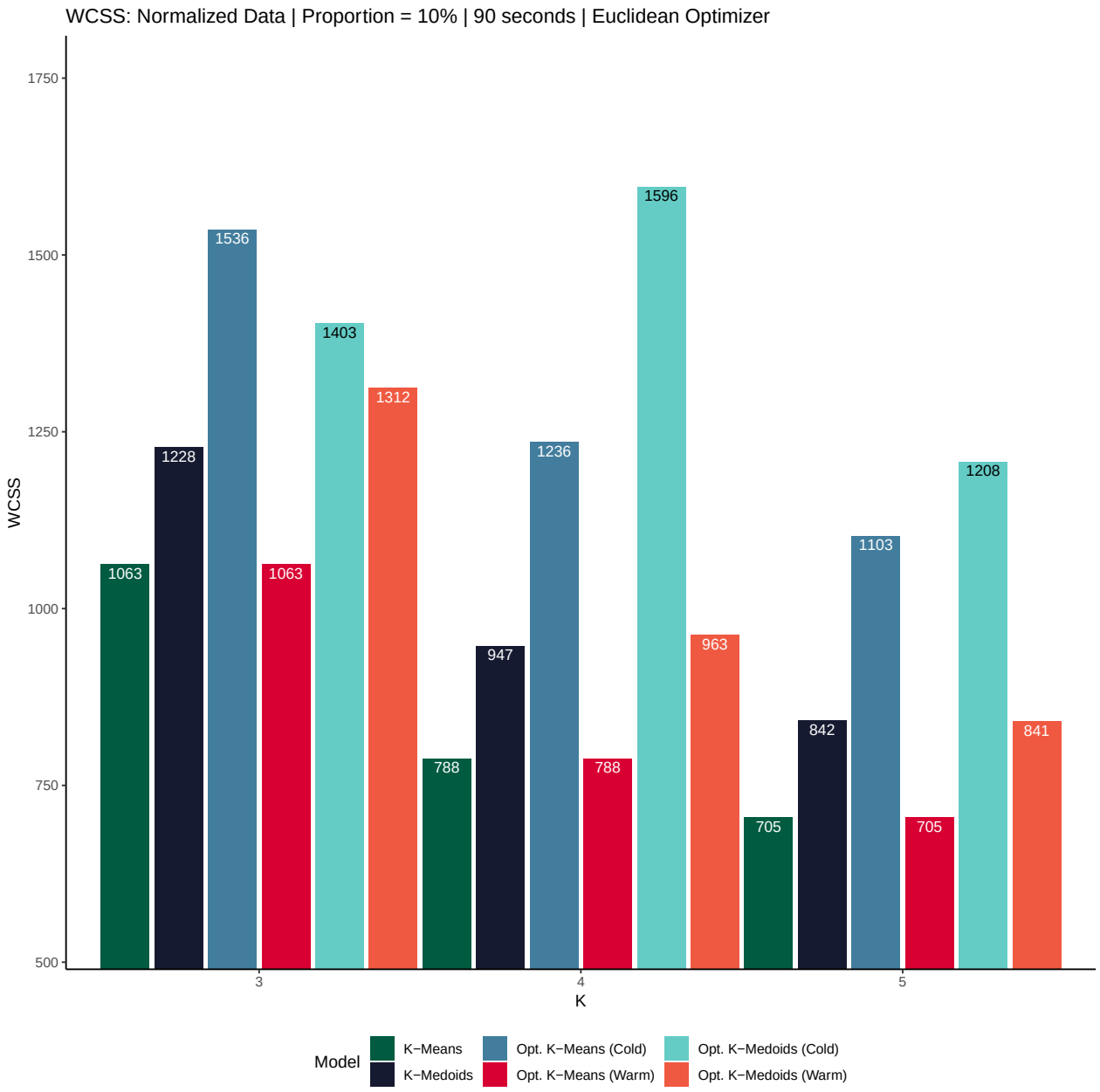

```
wcss_individual(abalone_combined, "Normalized", 0.25, "Euclidean", 30, 1500, 7750)
```



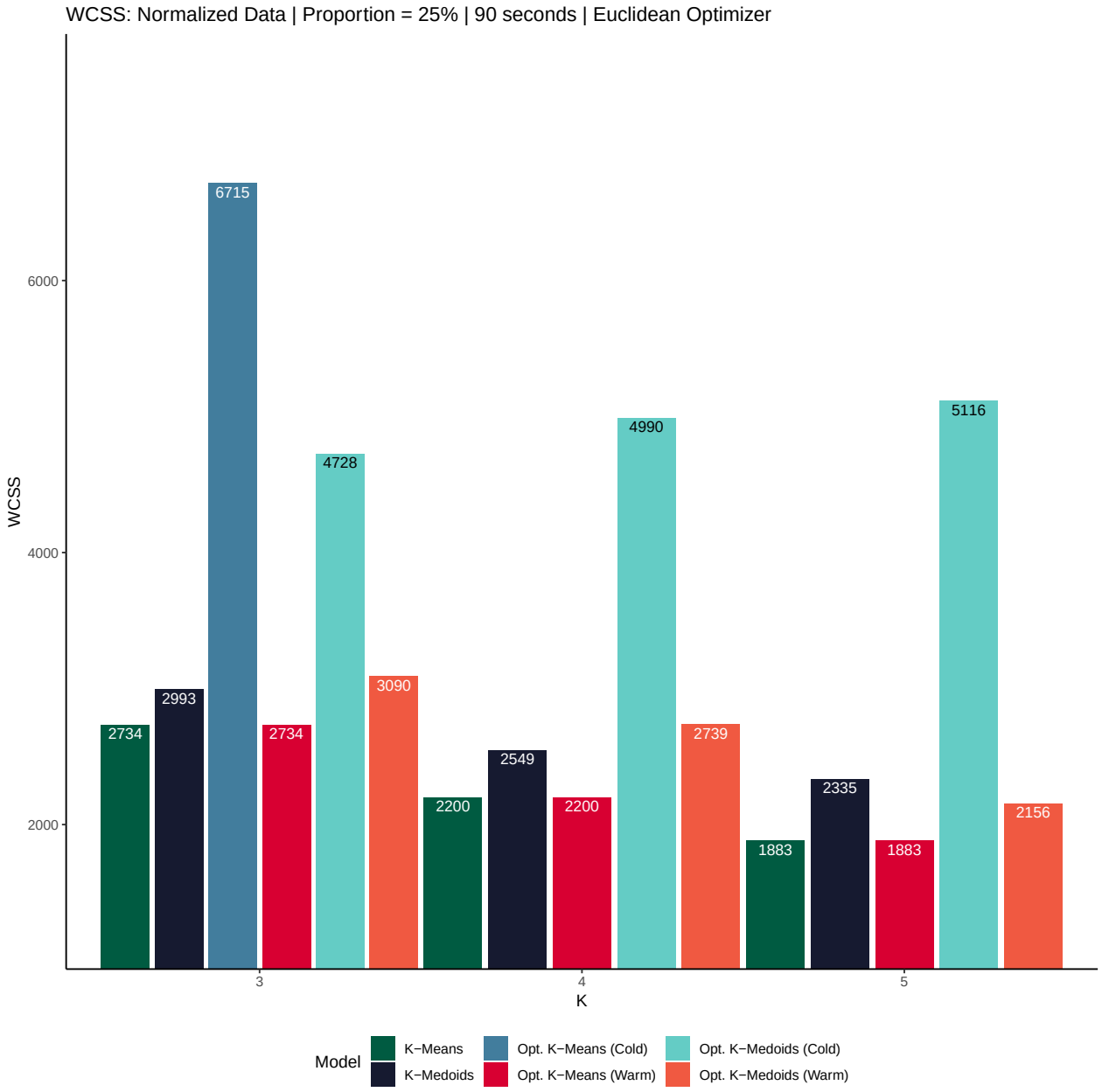

```
wcss_individual(abalone_combined, "Normalized", 0.75, "Euclidean", 30, 5500, 10000)
```



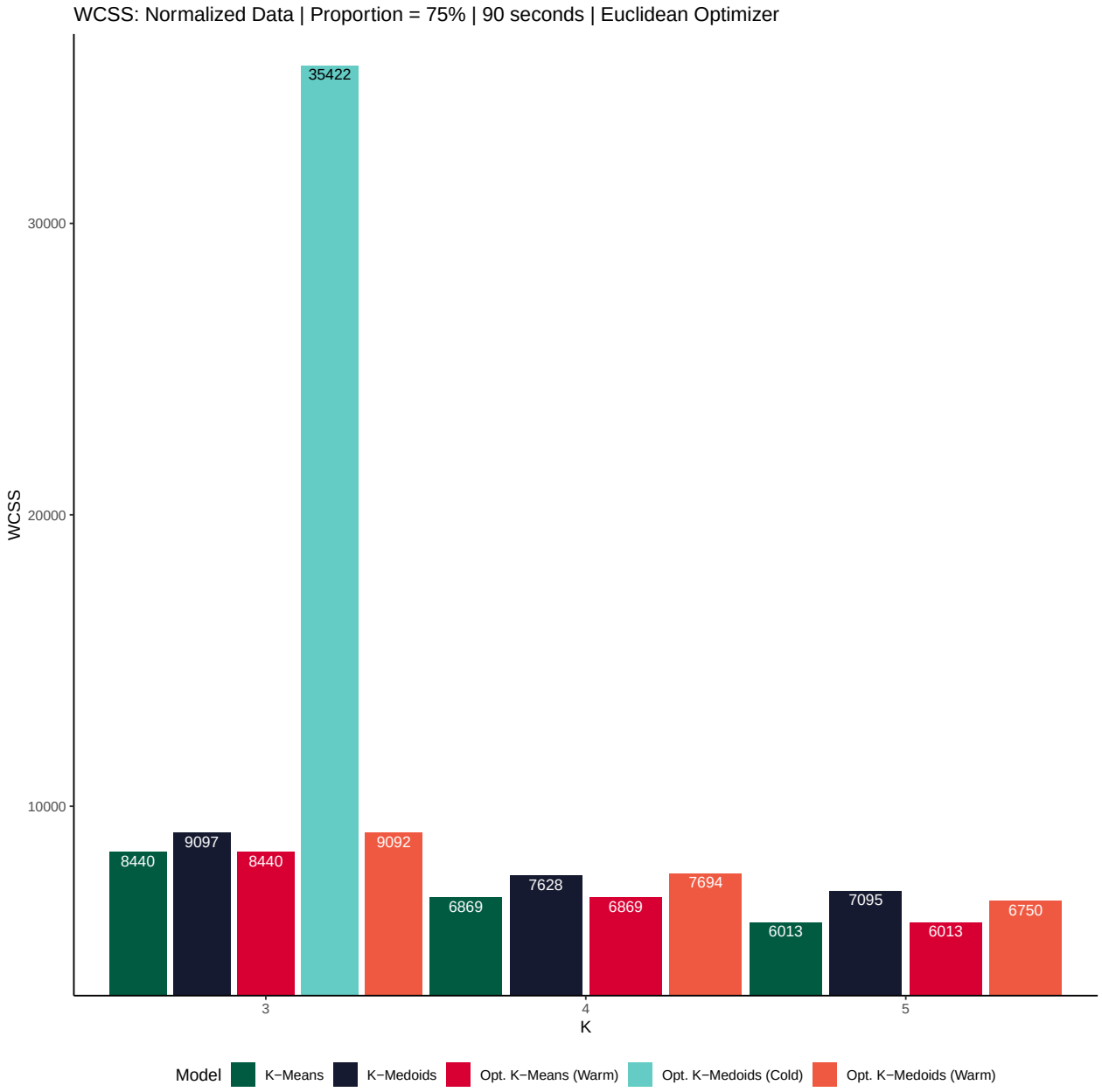

```
wcss_individual(abalone_combined, "Normalized", 0.10, "Euclidean", 90, 550, 1750)
```



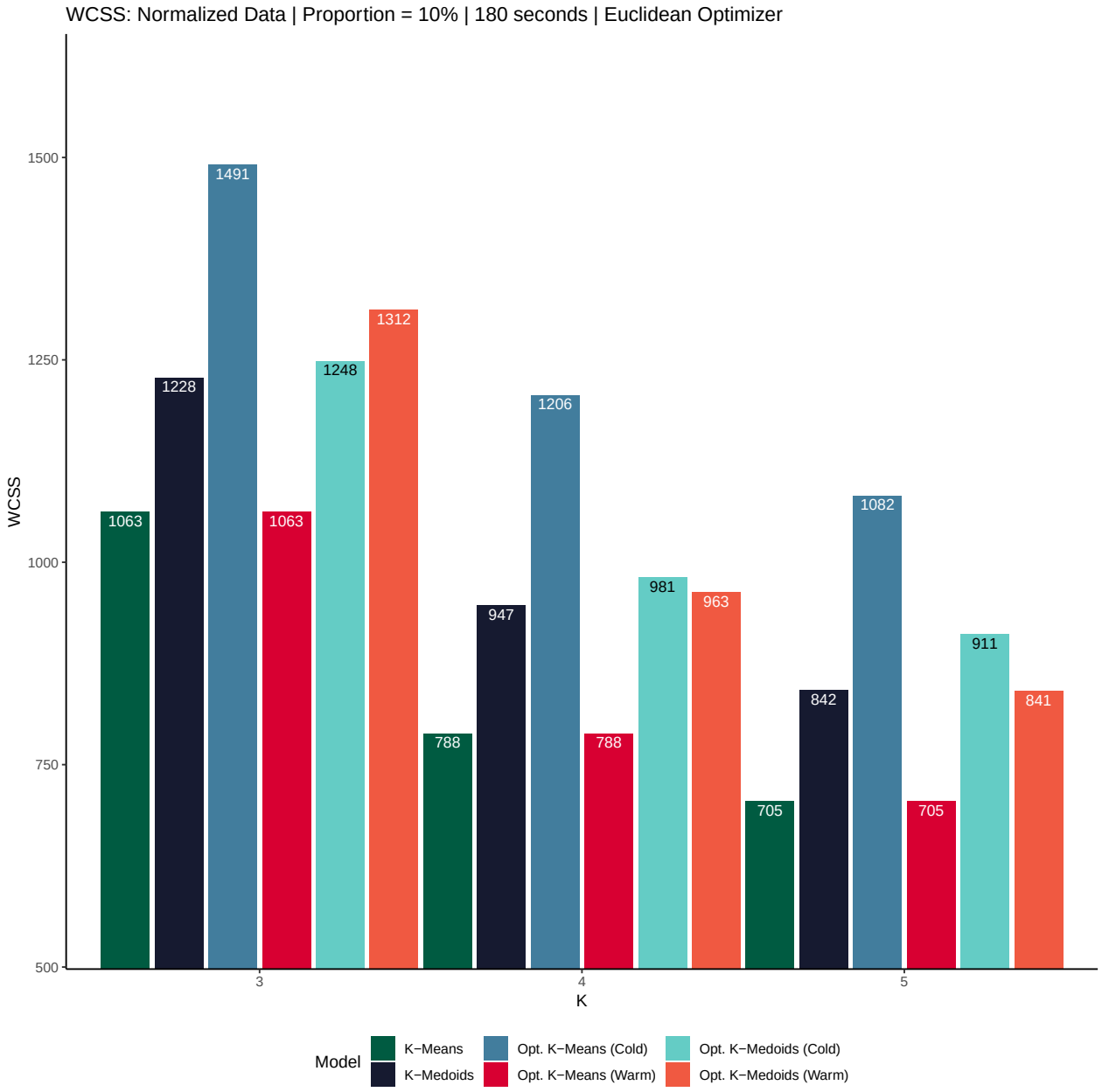

```
wcss_individual(abalone_combined, "Normalized", 0.25, "Euclidean", 90, 1250, 7500)
```



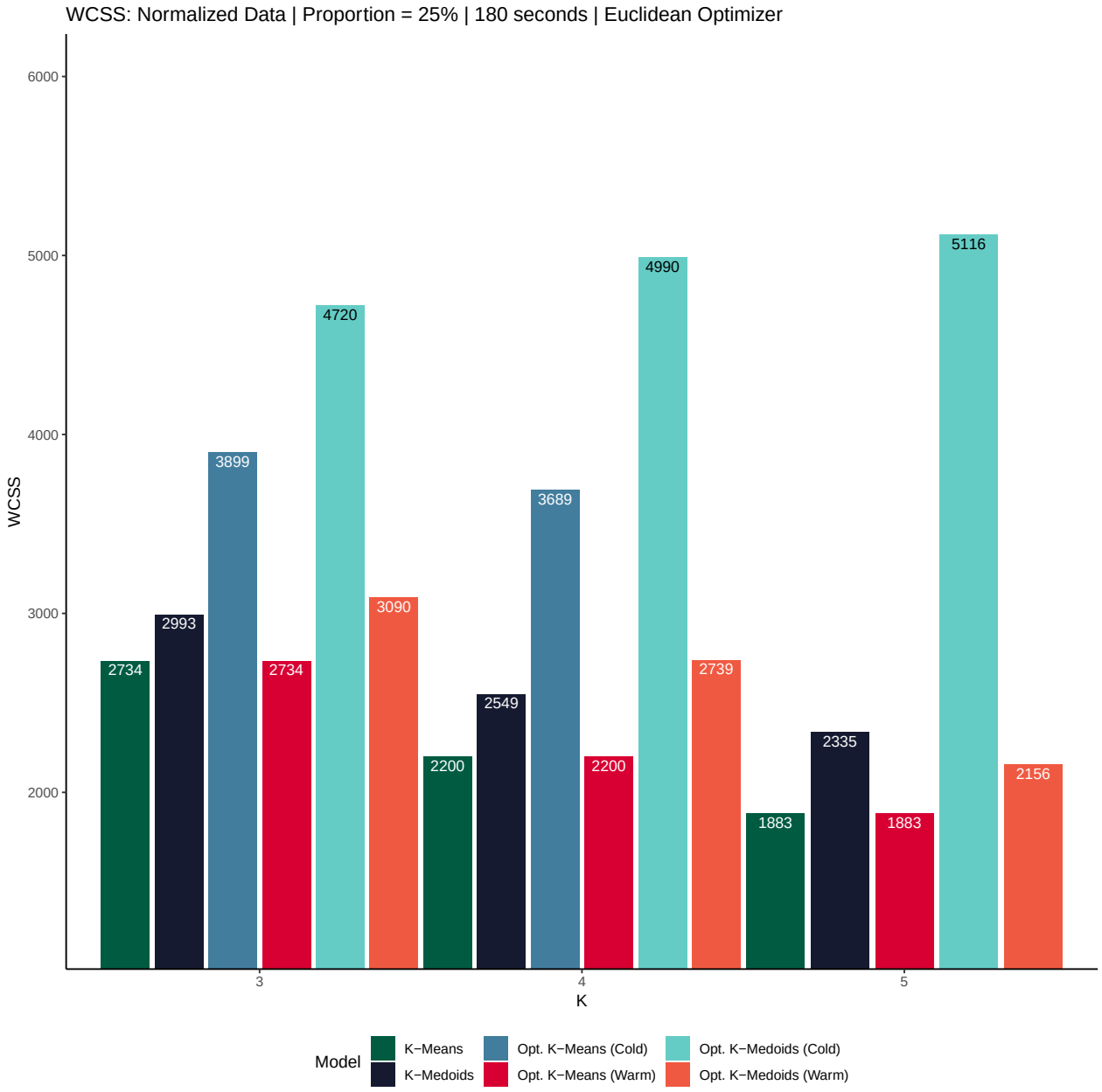

```
wcss_individual(abalone_combined, "Normalized", 0.75, "Euclidean", 90, 5000, 35000)
```



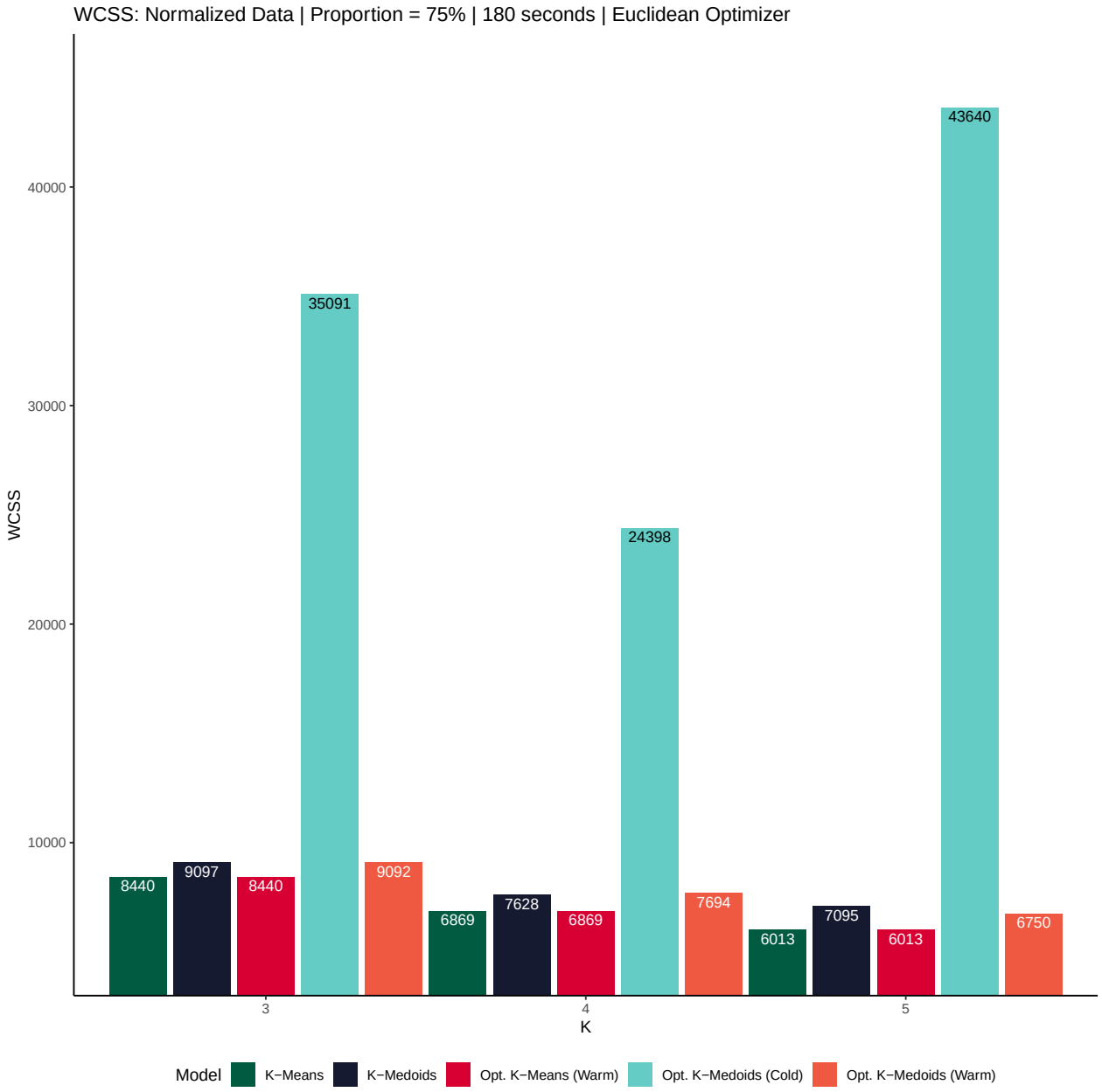

```
wcss_individual(abalone_combined, "Normalized", 0.10, "Euclidean", 180, 550, 1600)
```




```
wcss_individual(abalone_combined, "Normalized", 0.25, "Euclidean", 180, 1250, 6000)
```

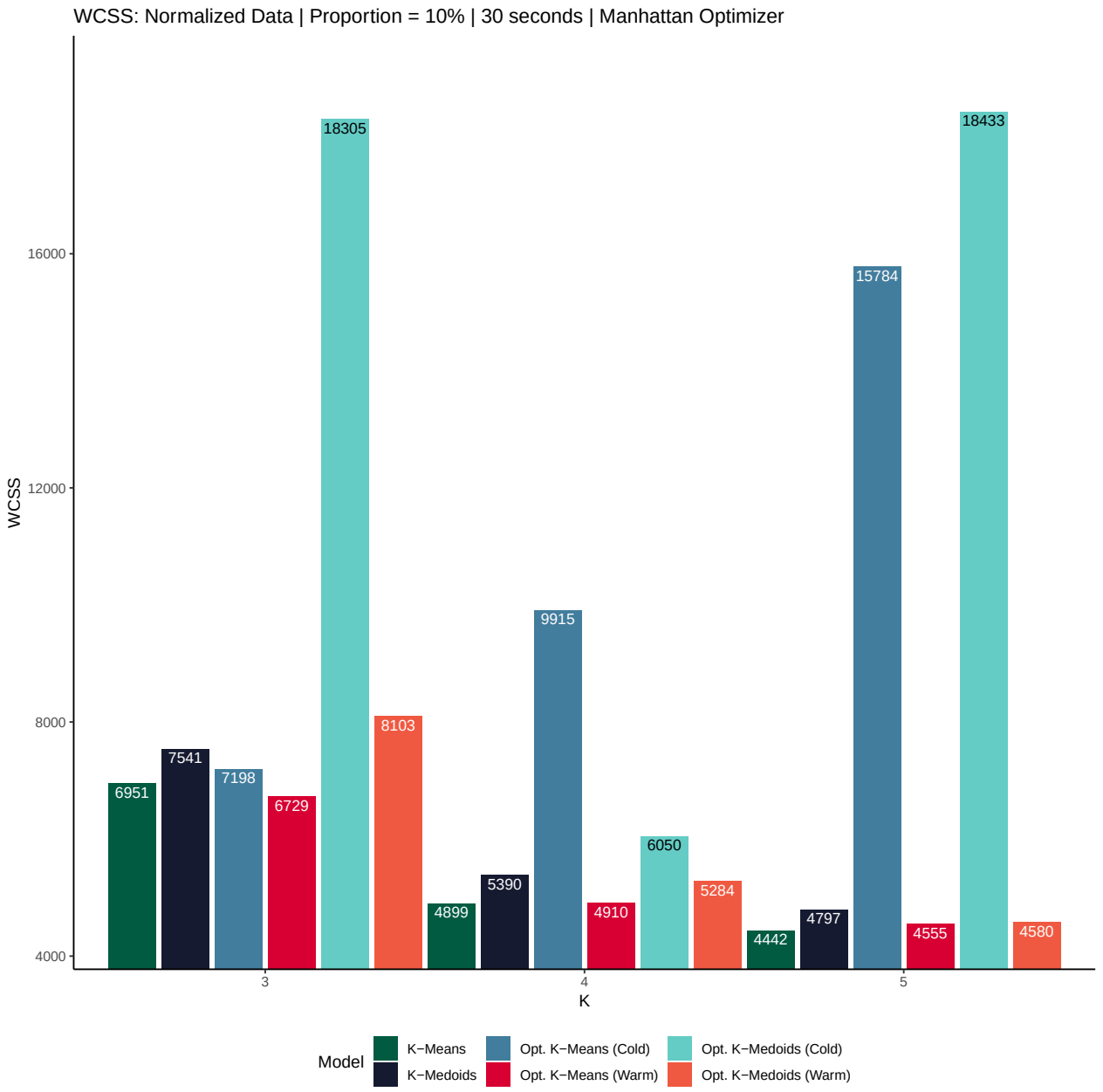



```
wcss_individual(abalone_combined, "Normalized", 0.75, "Euclidean", 180, 5000, 45000)
```

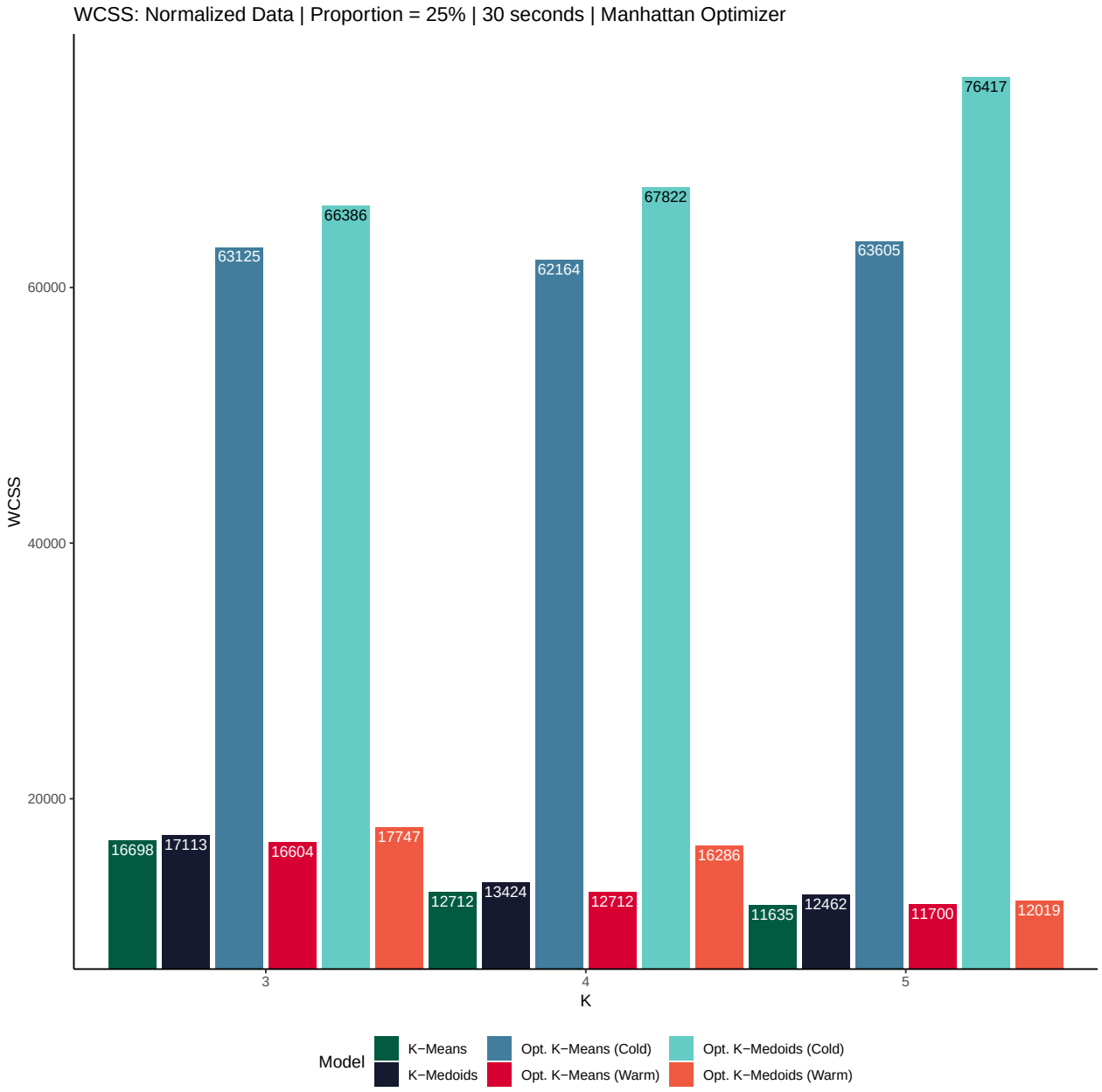


Individual Manhattan:

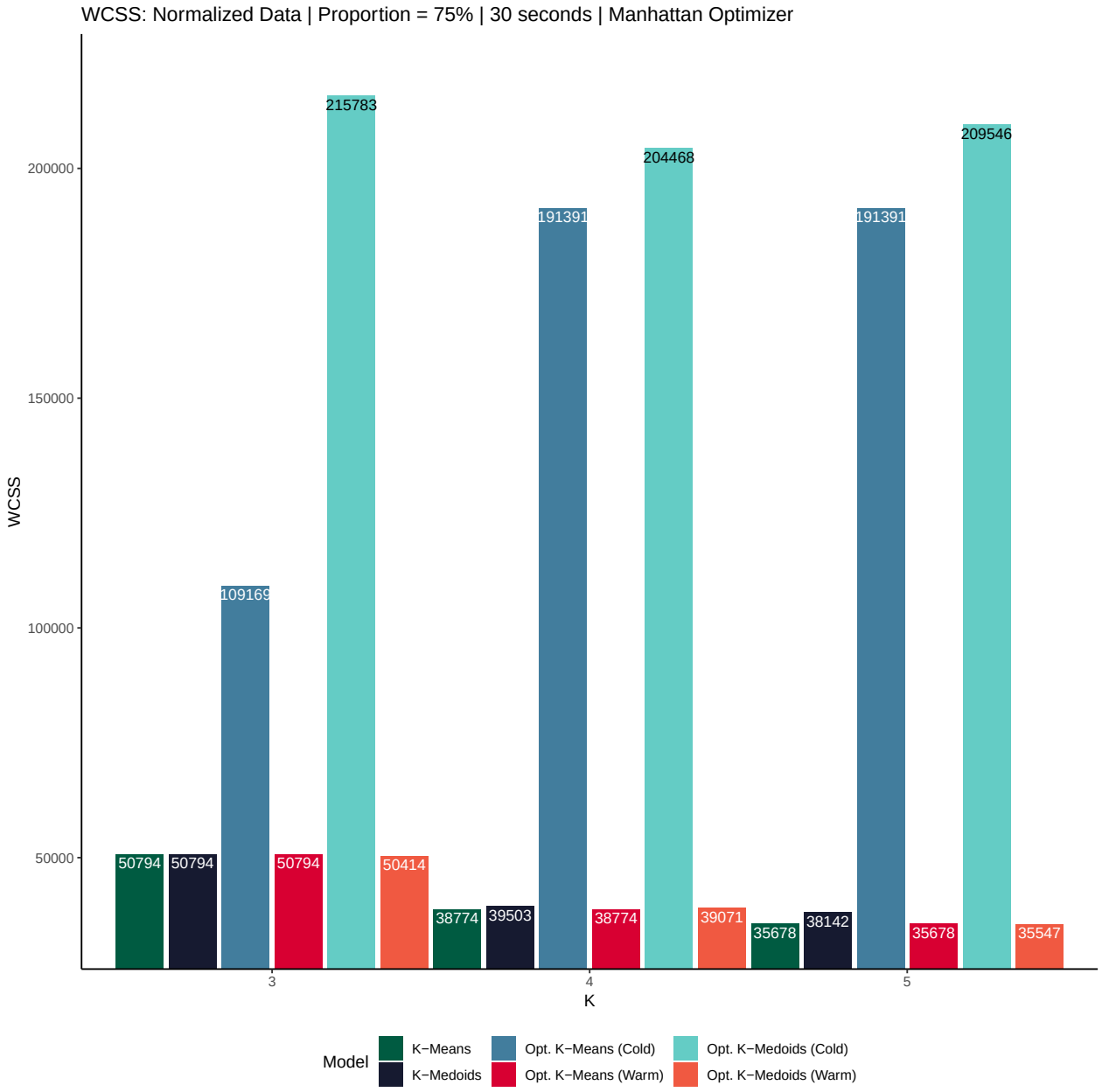
```
wcss_individual(abalone_combined, "Normalized", 0.10, "Manhattan", 30, 4500, 19000)
```



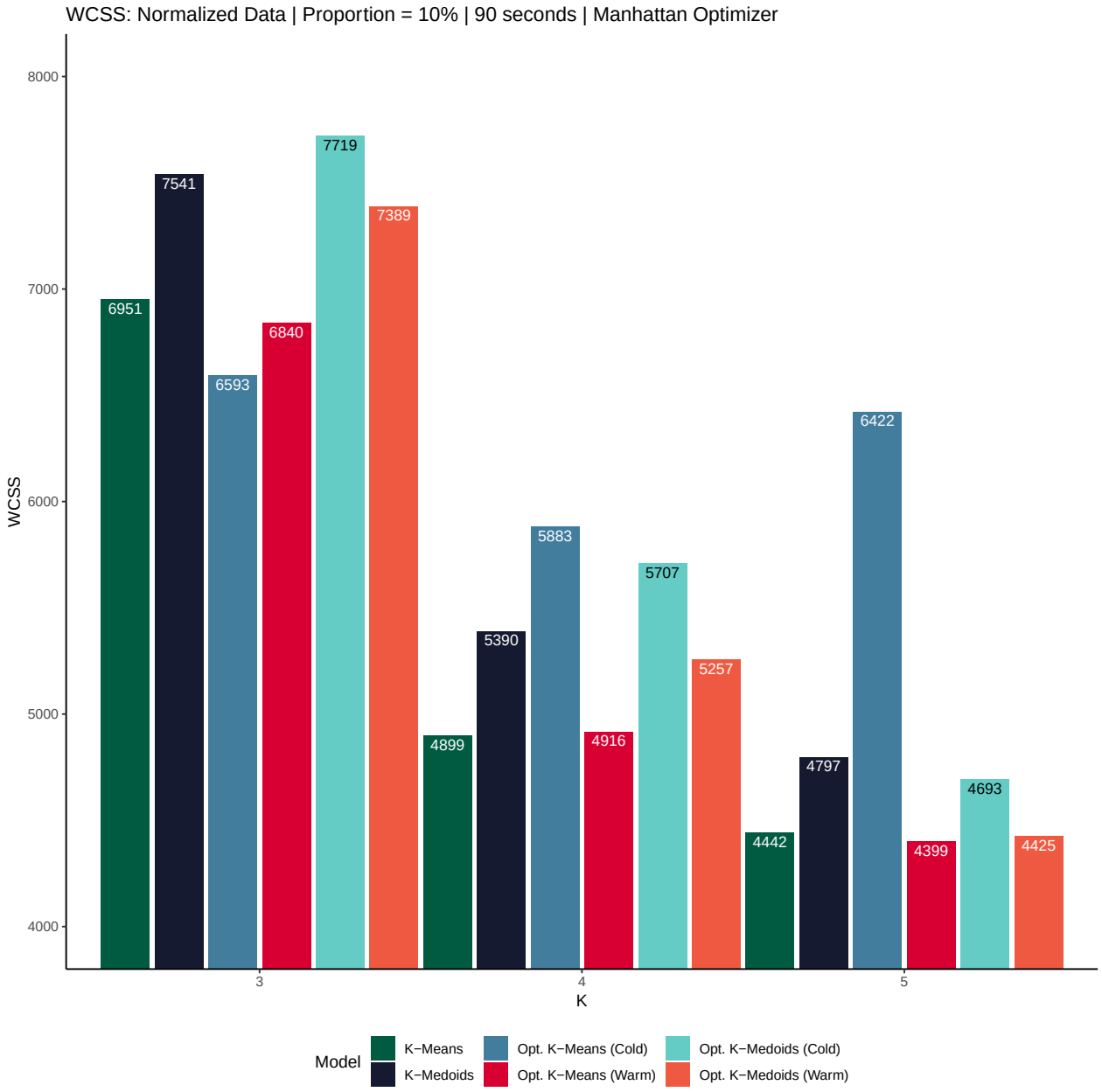

```
wcss_individual(abalone_combined, "Normalized", 0.25, "Manhattan", 30, 10000, 76500)
```



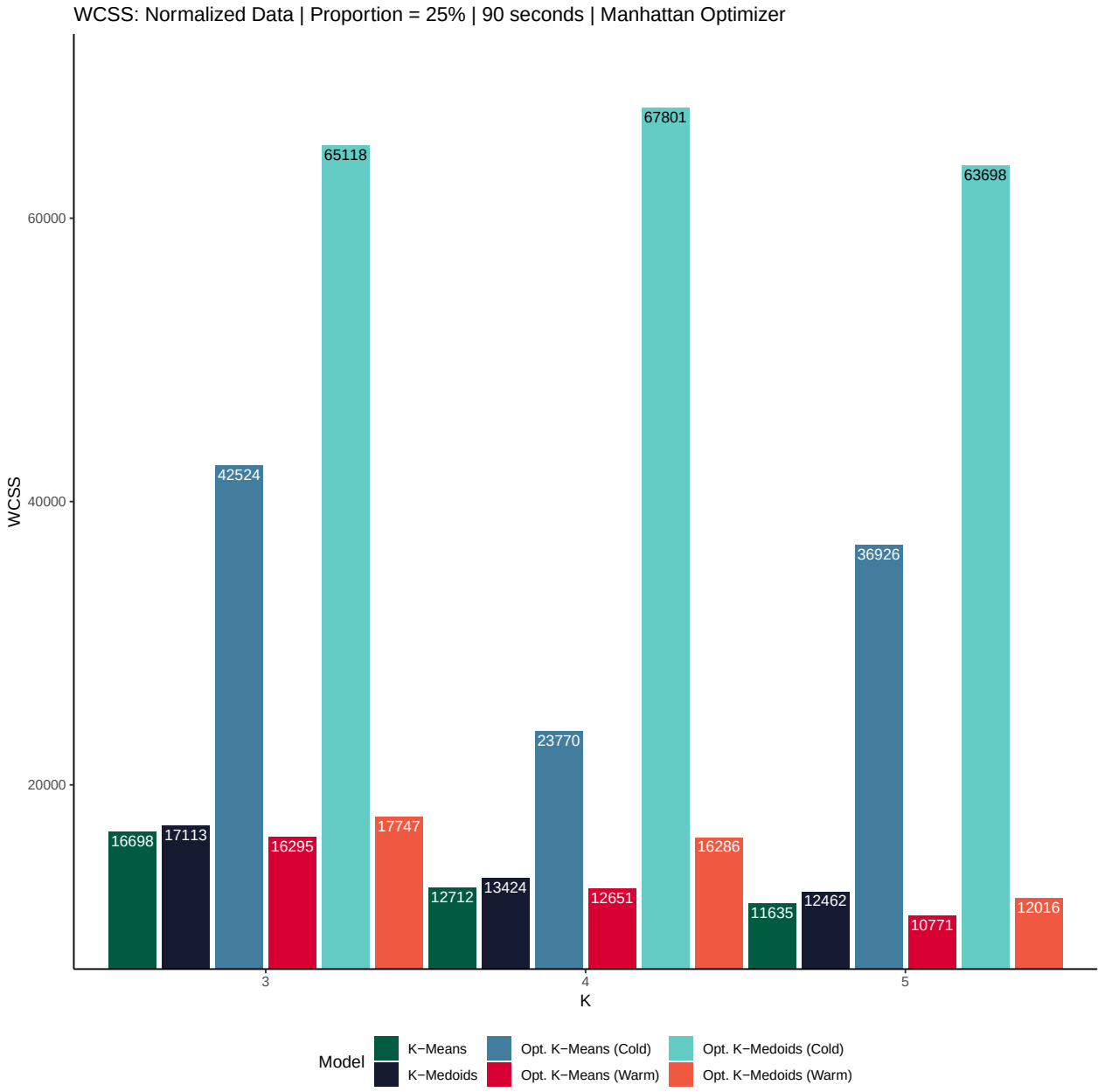

```
wcss_individual(abalone_combined, "Normalized", 0.75, "Manhattan", 30, 35000, 220000)
```



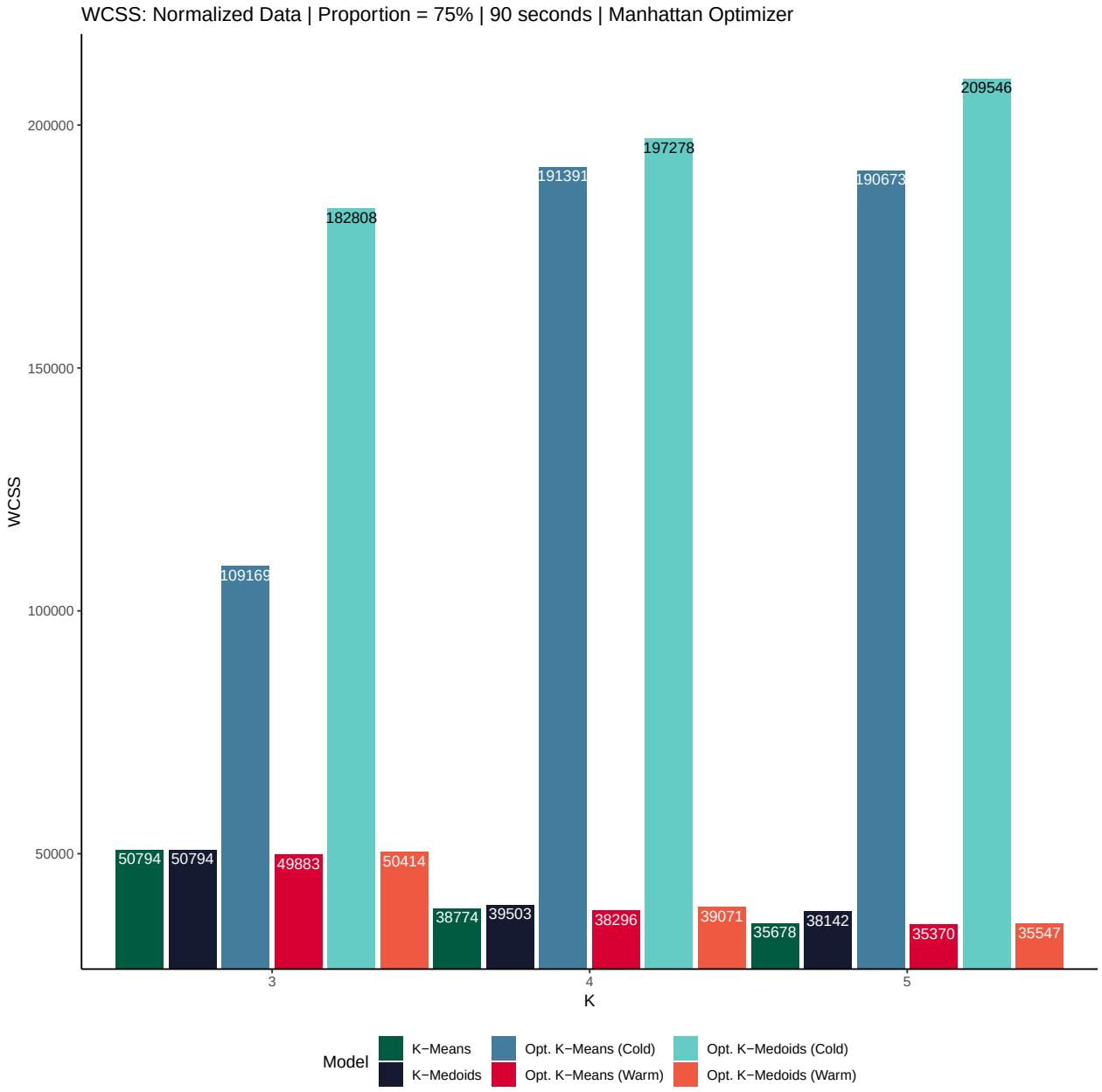

```
wcss_individual(abalone_combined, "Normalized", 0.10, "Manhattan", 90, 4000, 8000)
```



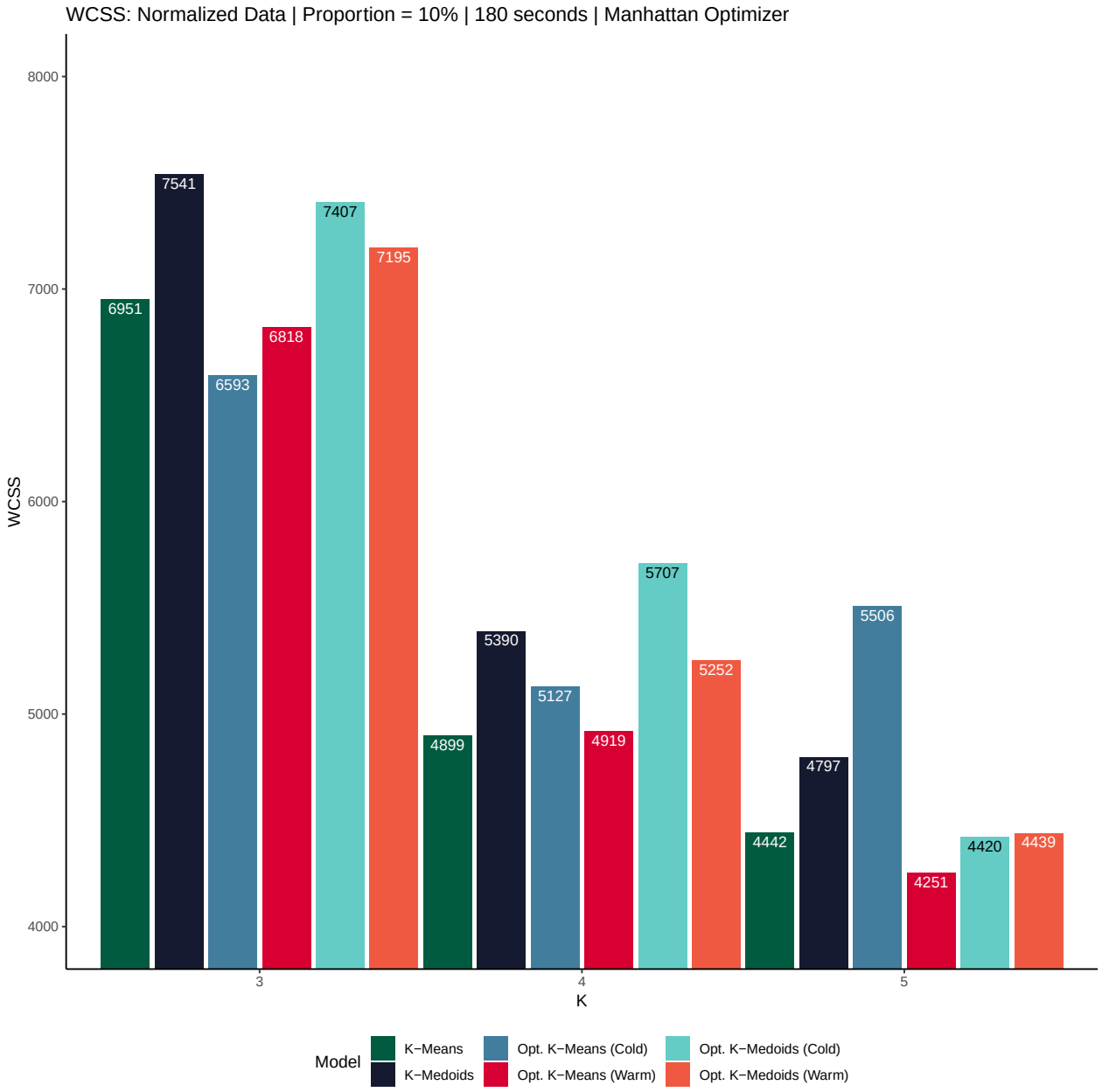

```
wcss_individual(abalone_combined, "Normalized", 0.25, "Manhattan", 90, 10000, 70000)
```



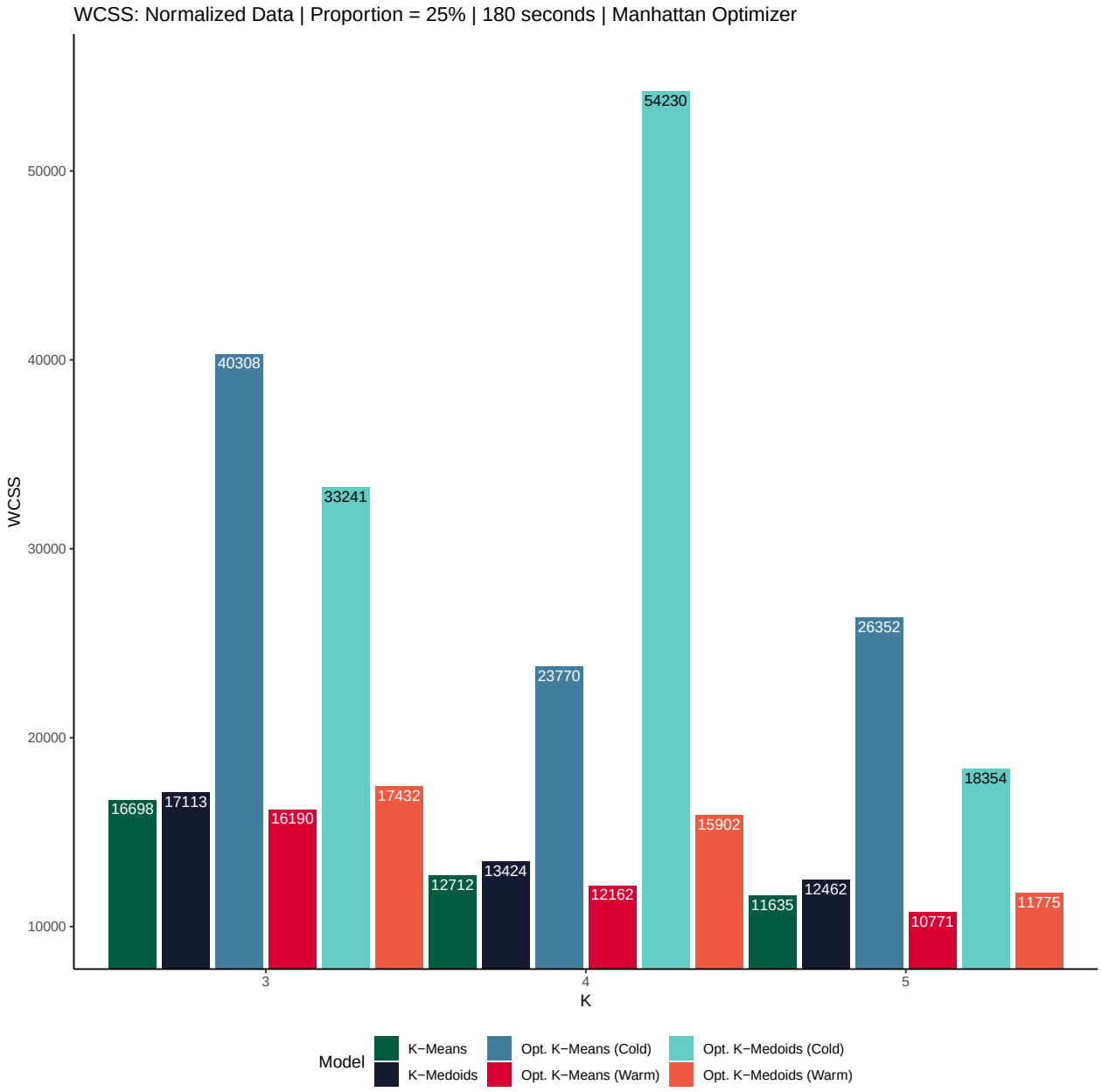

```
wcss_individual(abalone_combined, "Normalized", 0.75, "Manhattan", 90, 35000, 210000)
```



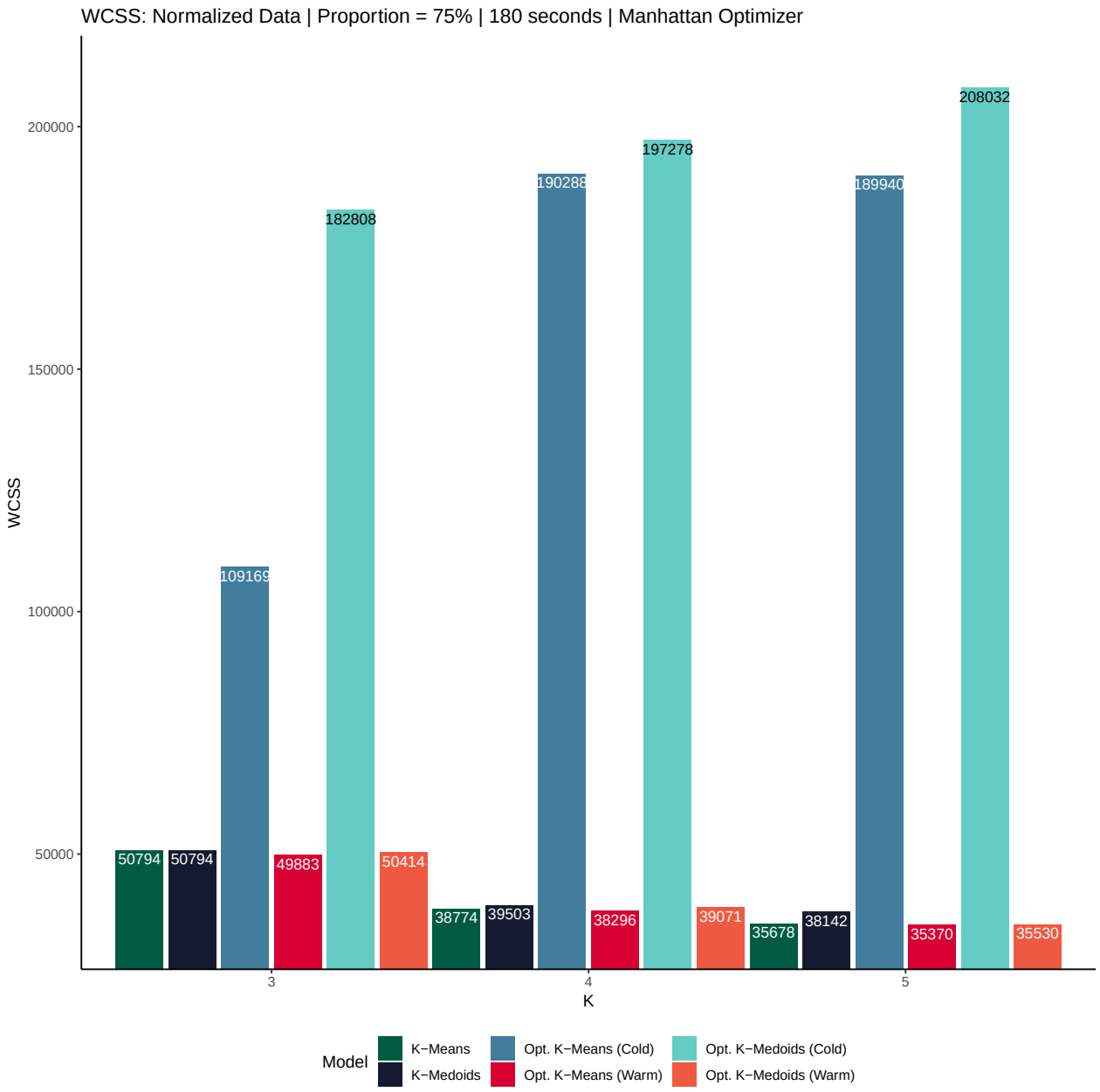

```
wcss_individual(abalone_combined, "Normalized", 0.10, "Manhattan", 180, 4000, 8000)
```




```
wcss_individual(abalone_combined, "Normalized", 0.25, "Manhattan", 180, 10000, 55000)
```



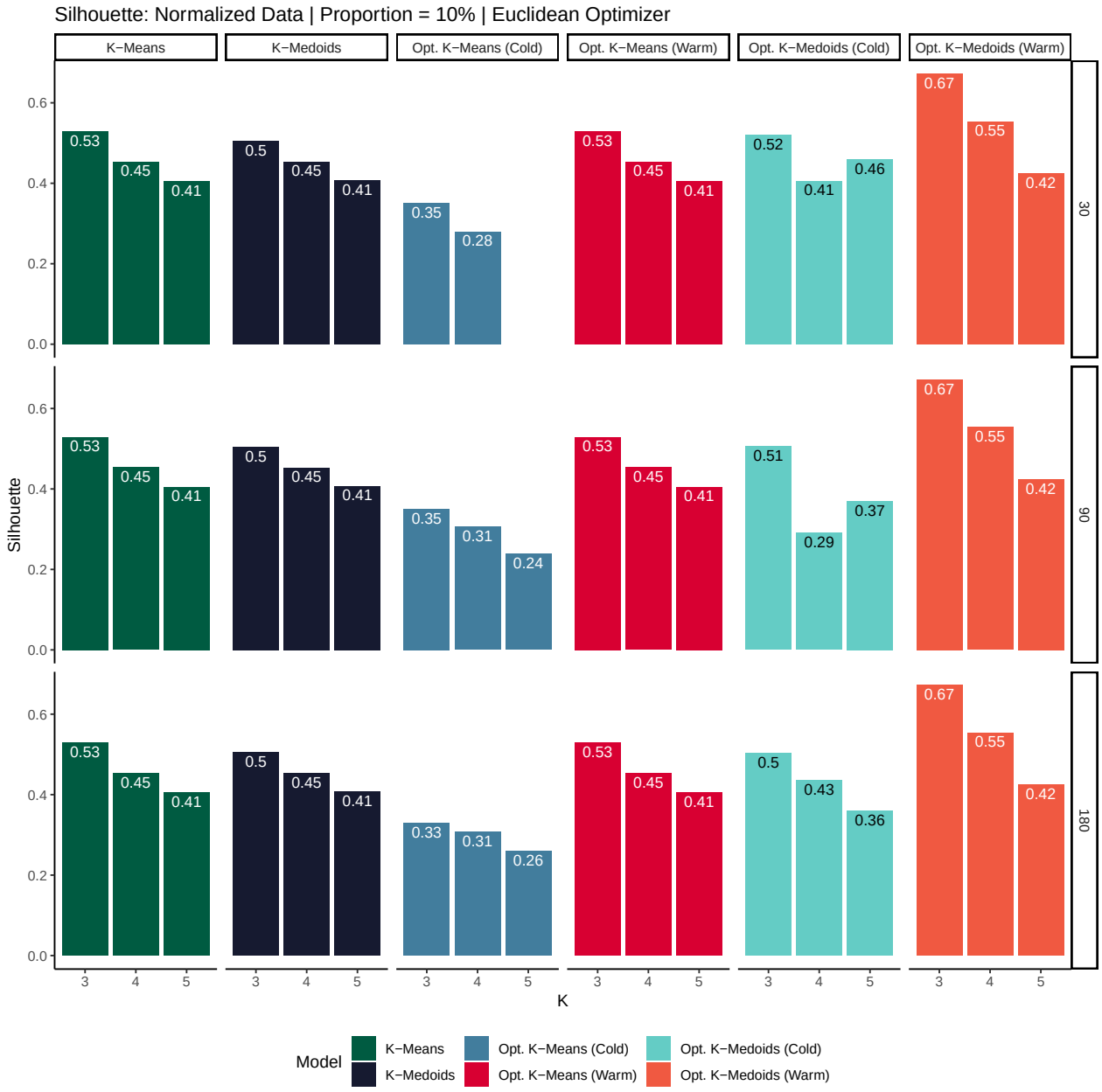

```
wcss_individual(abalone_combined, "Normalized", 0.75, "Manhattan", 180, 35000, 210000)
```



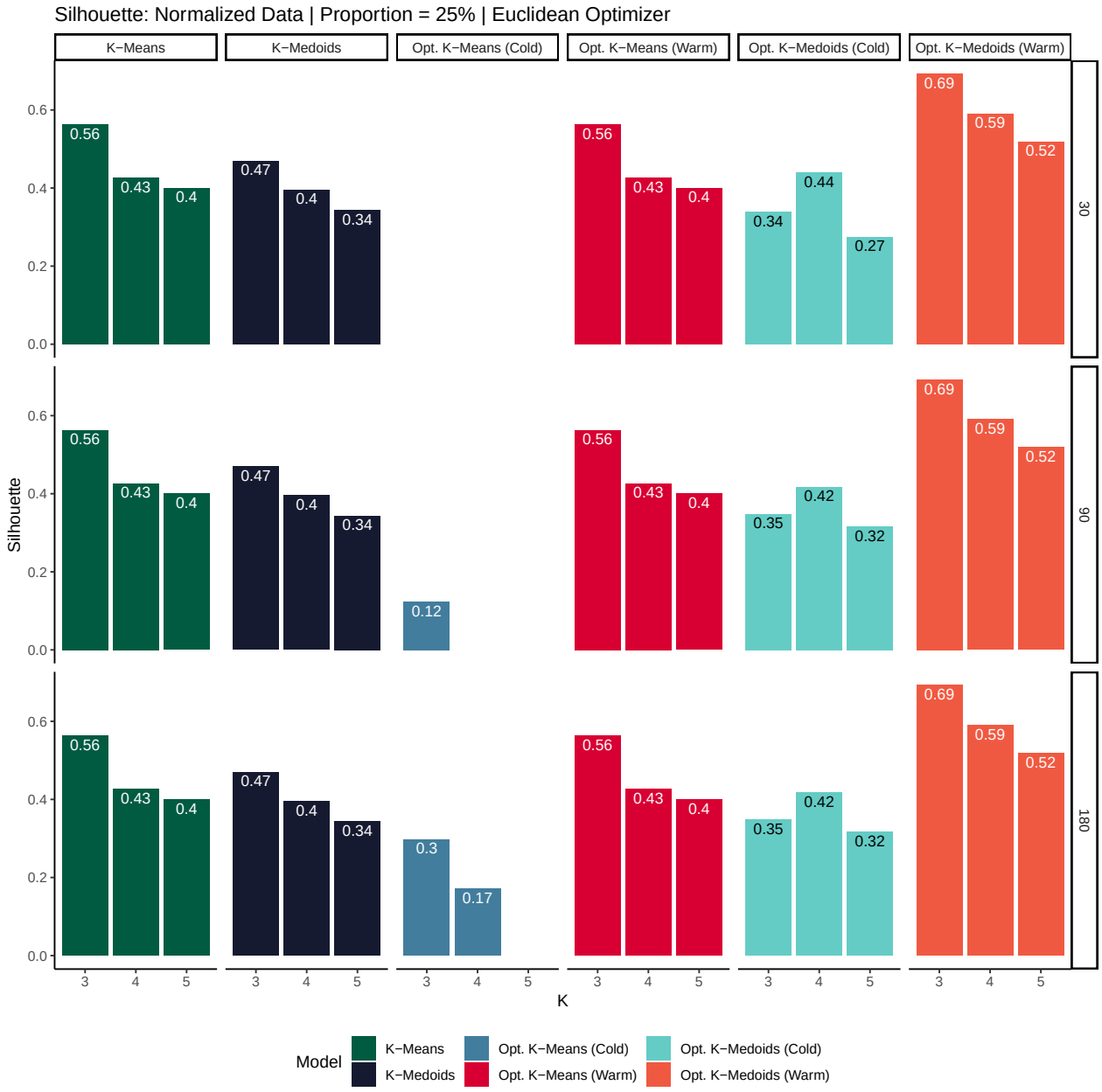
Silhouette Normalized Plots:

Euclidean:

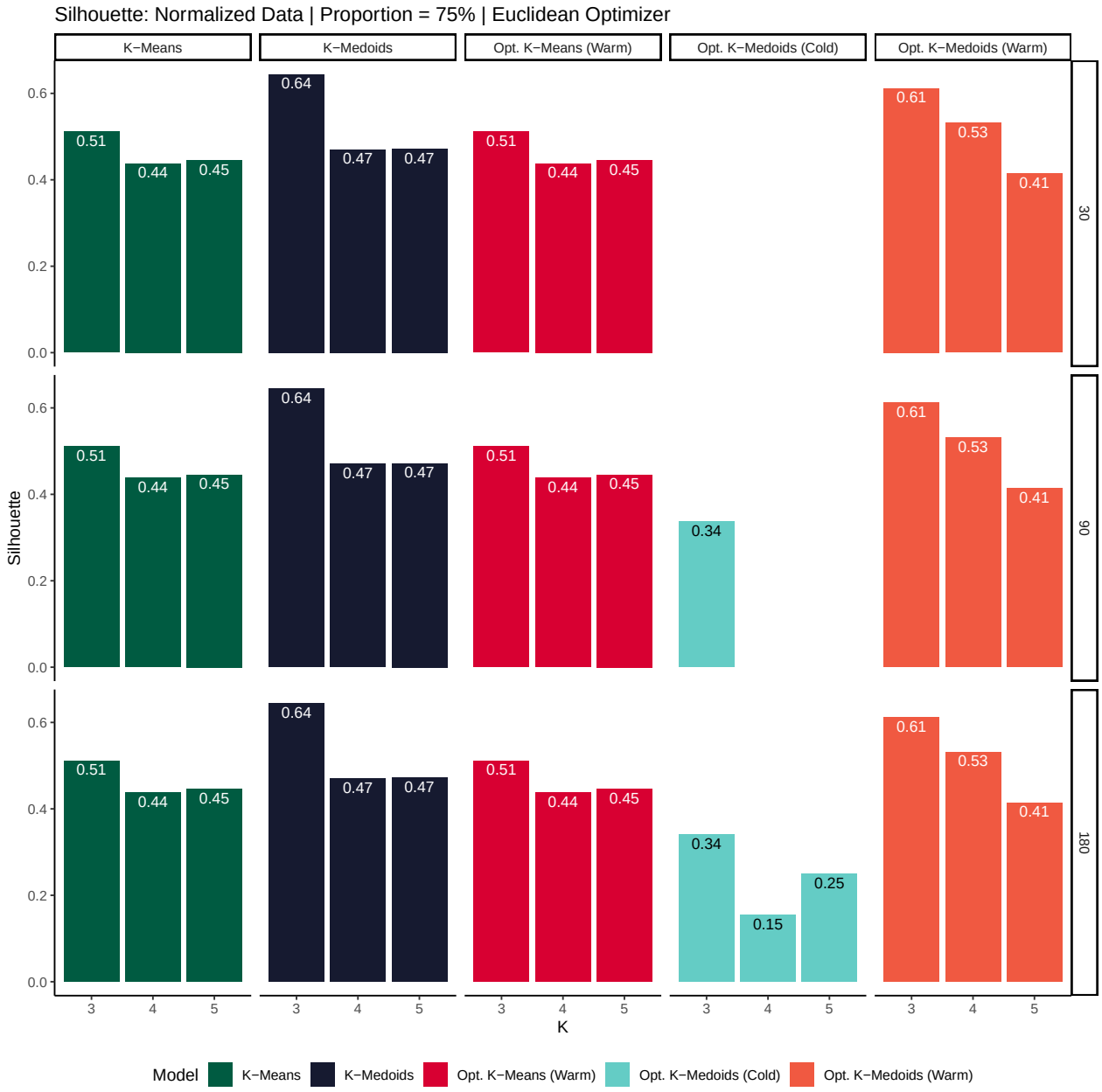
```
silhouette_grouped(abalone_combined, "Normalized", 0.10, "Euclidean", y_scale="free")
```




```
silhouette_grouped(abalone_combined, "Normalized", 0.25, "Euclidean", y_scale="free")
```

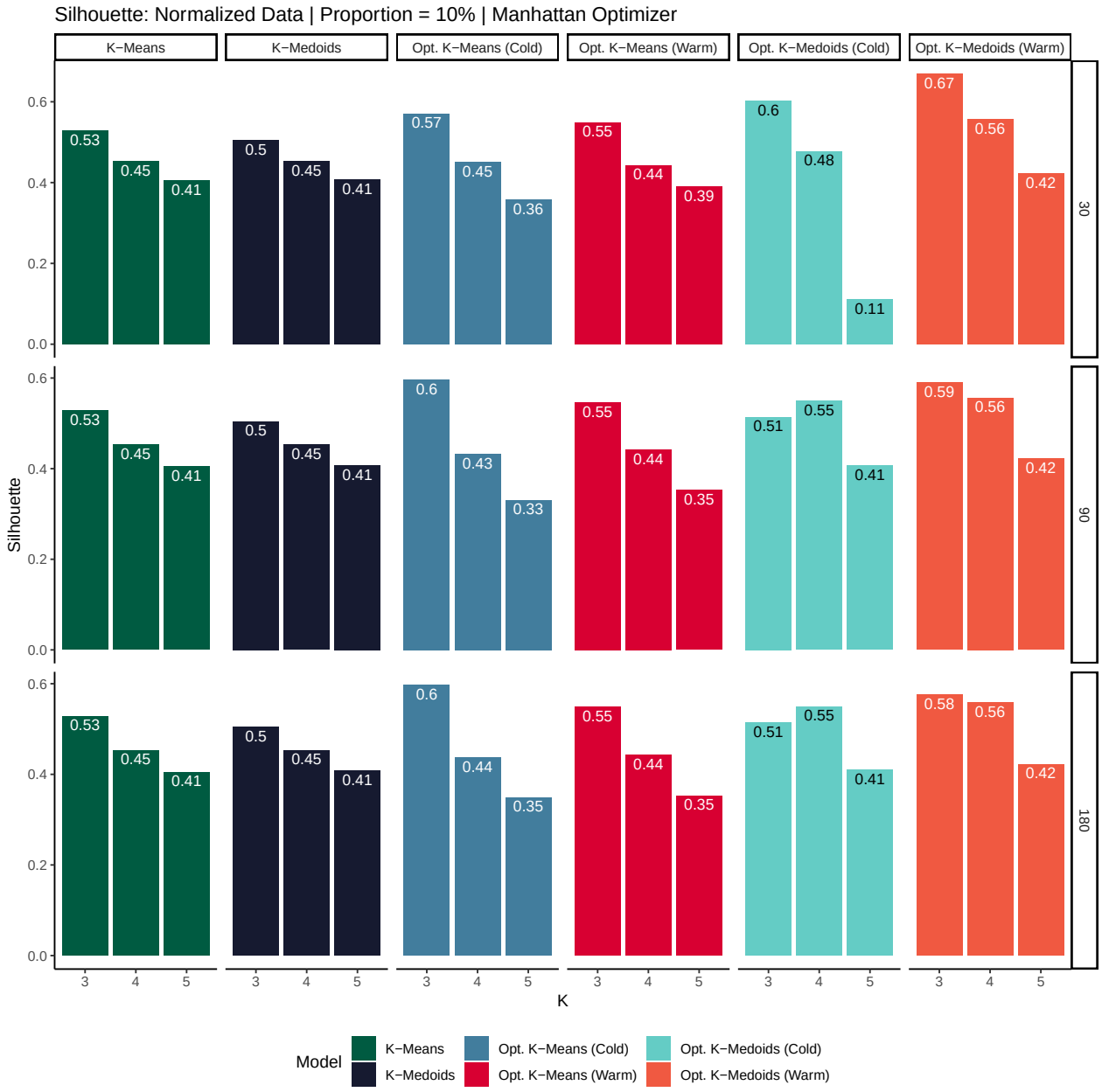



```
silhouette_grouped(abalone_combined, "Normalized", 0.75, "Euclidean", y_scale="free")
```

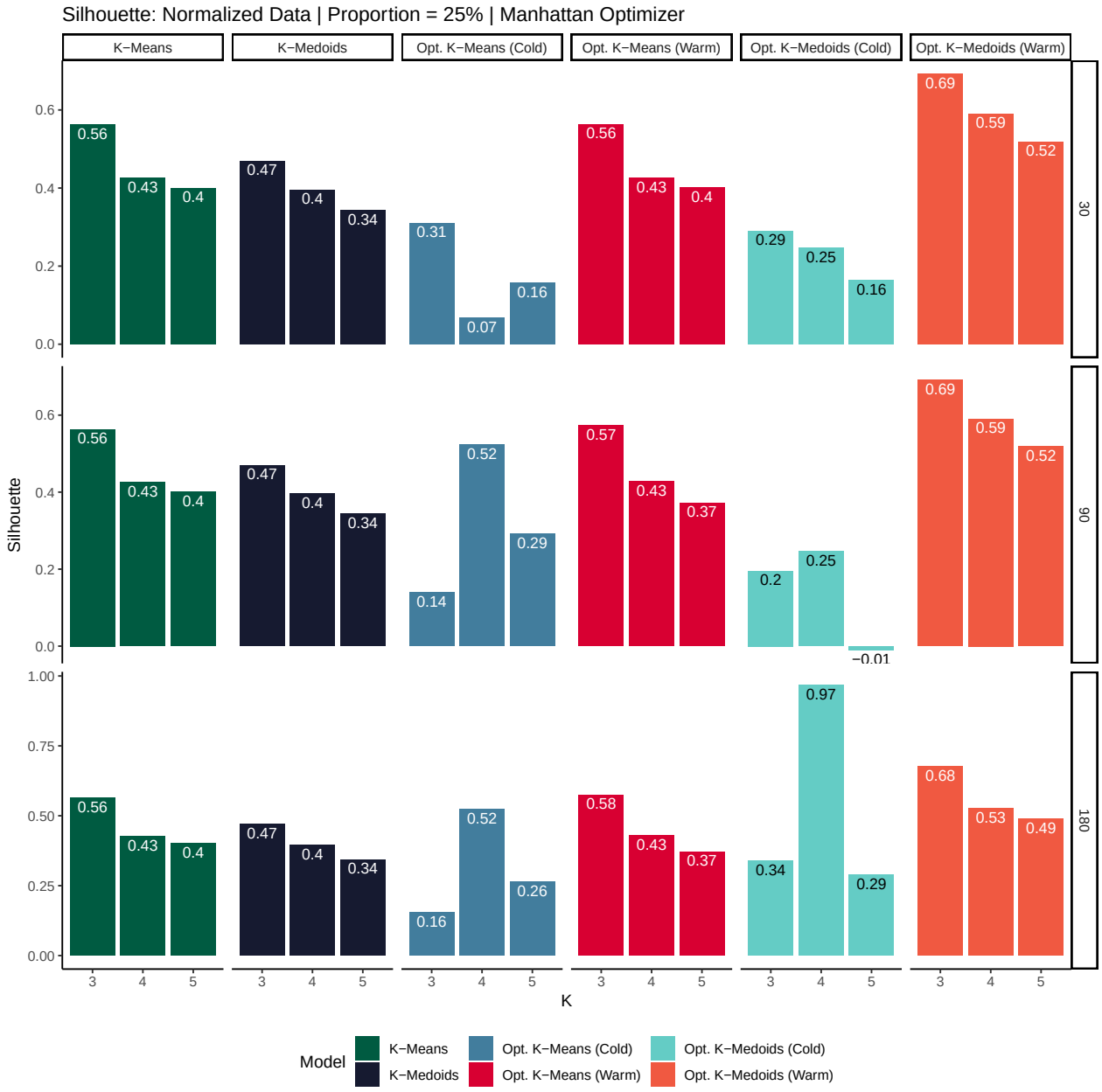


Manhattan:

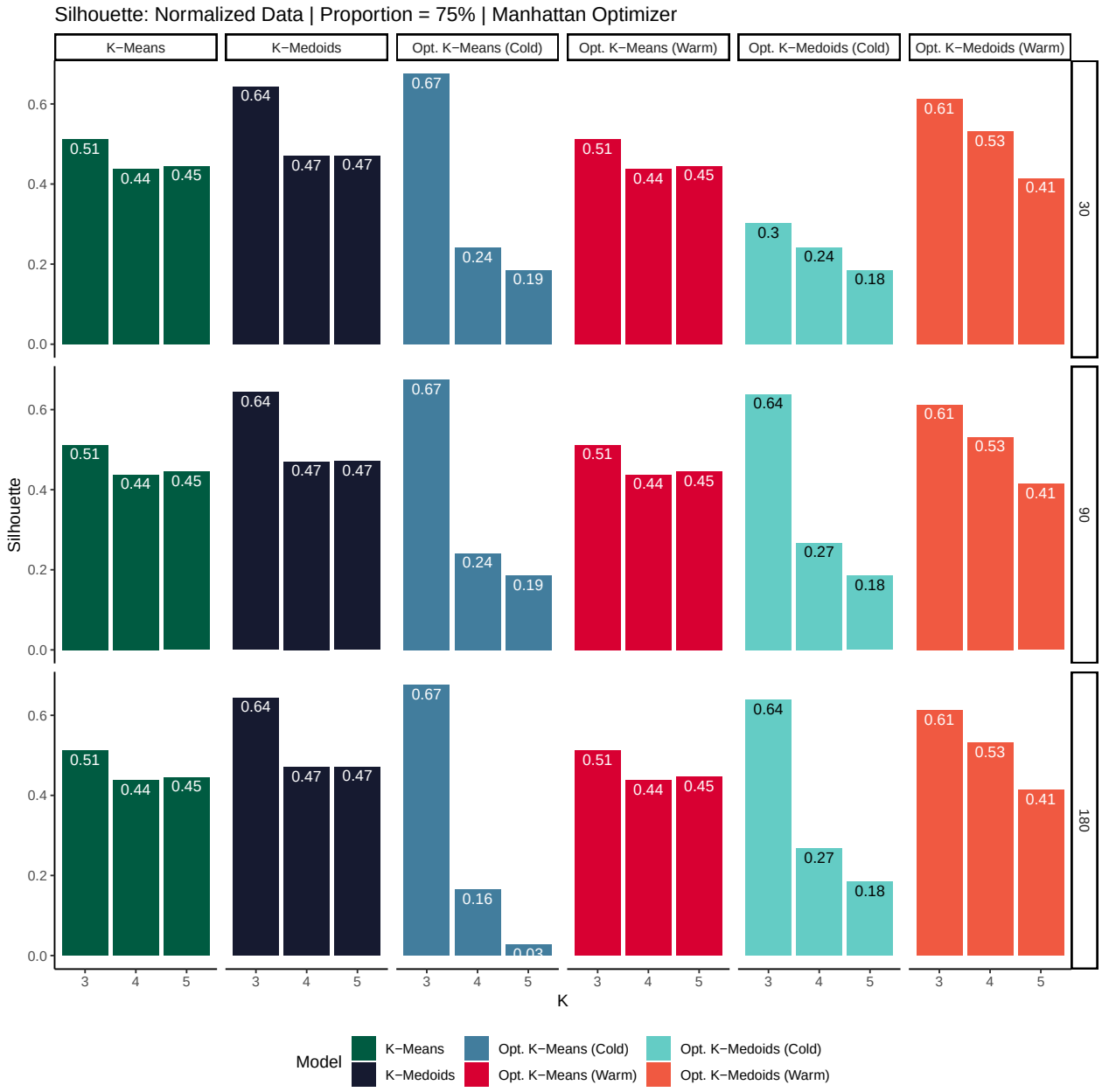
```
silhouette_grouped(abalone_combined, "Normalized", 0.10, "Manhattan", y_scale="free")
```




```
silhouette_grouped(abalone_combined, "Normalized", 0.25, "Manhattan", y_scale="free")
```

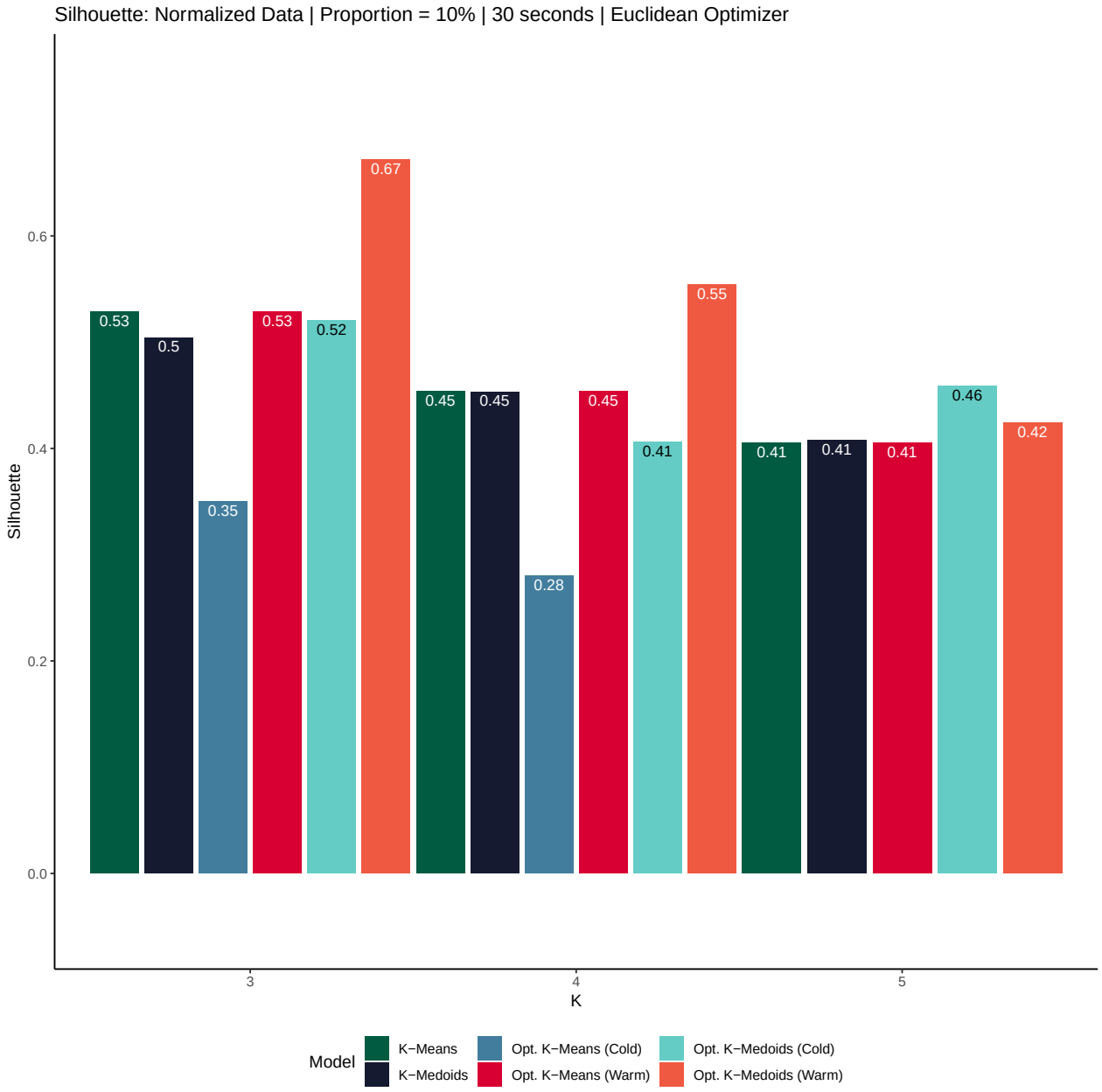



```
silhouette_grouped(abalone_combined, "Normalized", 0.75, "Manhattan", y_scale="free")
```

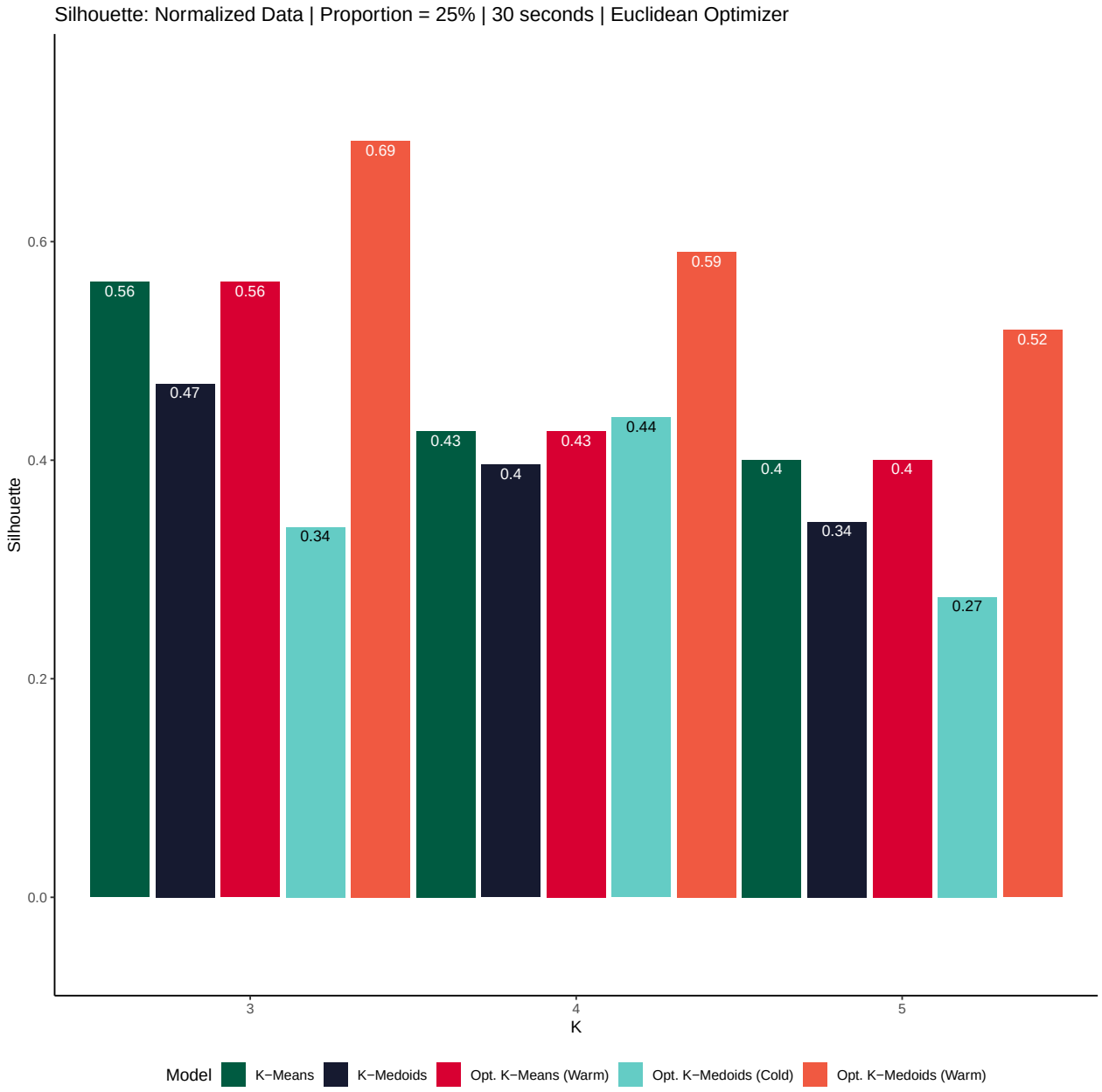


Individual Euclidean:

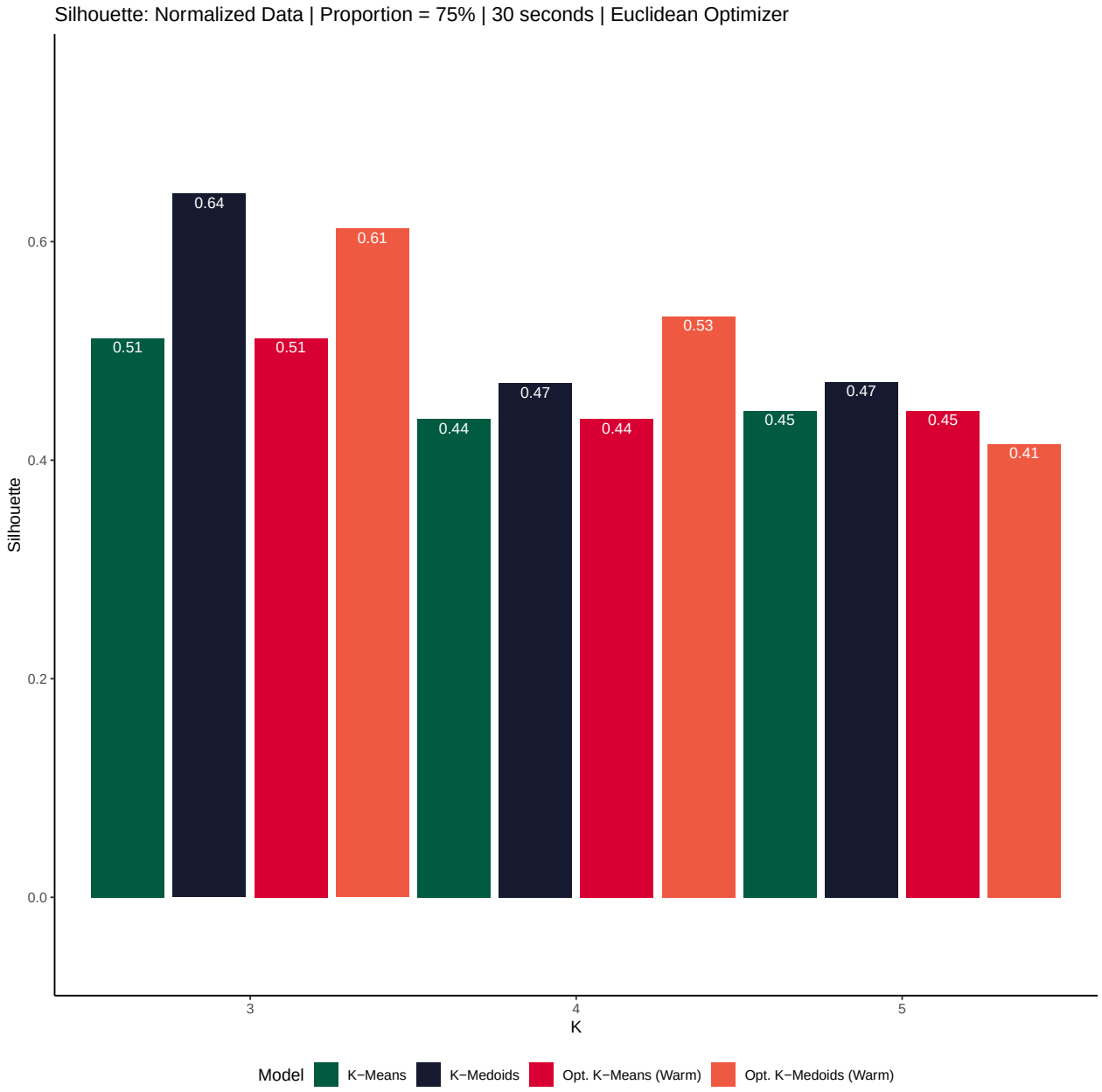
```
1 silhouette_individual(abalone_combined, "Normalized", 0.10, "Euclidean", 30, -0.05, 0.75)
```



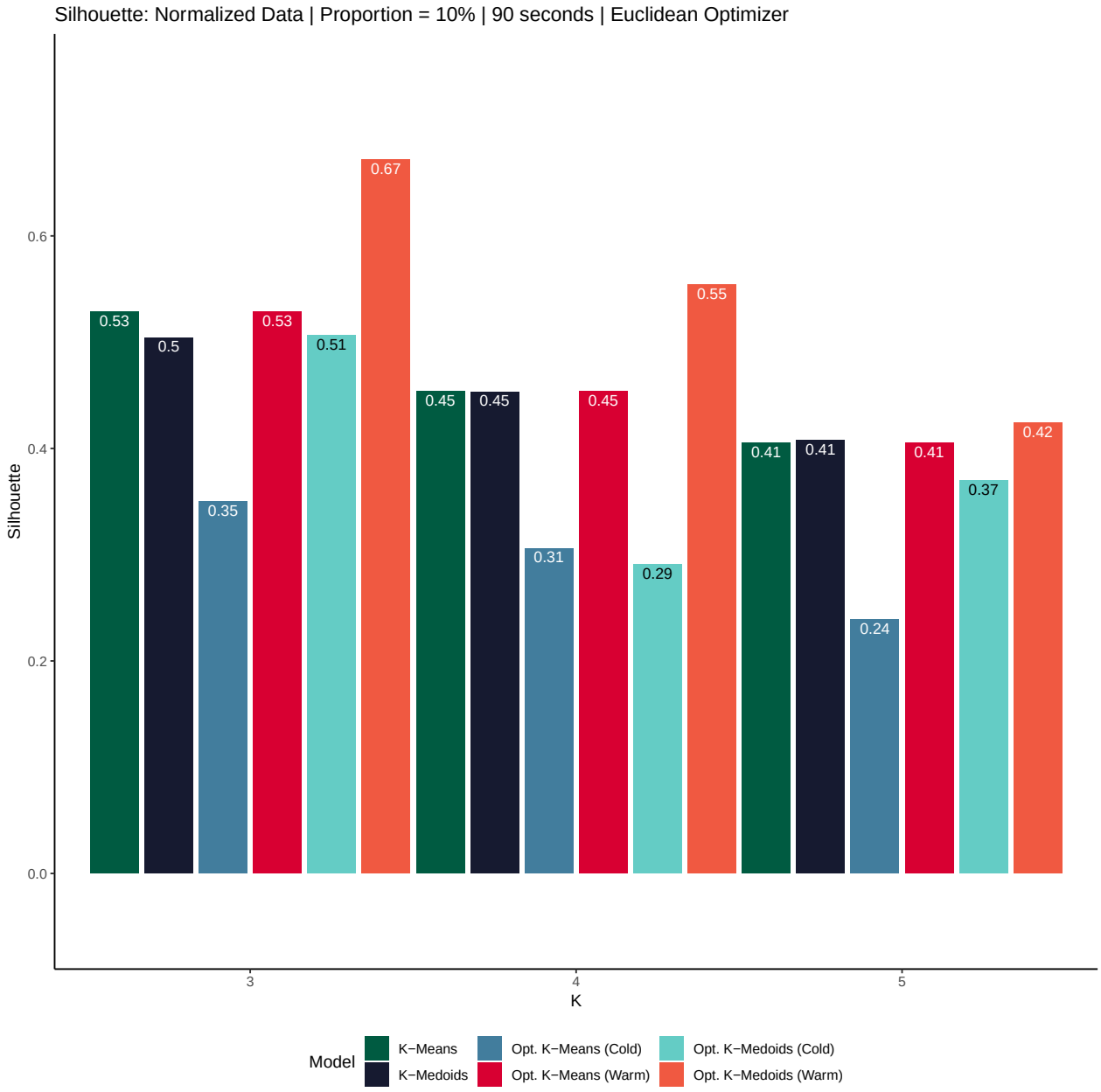

```
silhouette_individual(abalone_combined, "Normalized", 0.25, "Euclidean", 30, -0.05, 0.75)
```



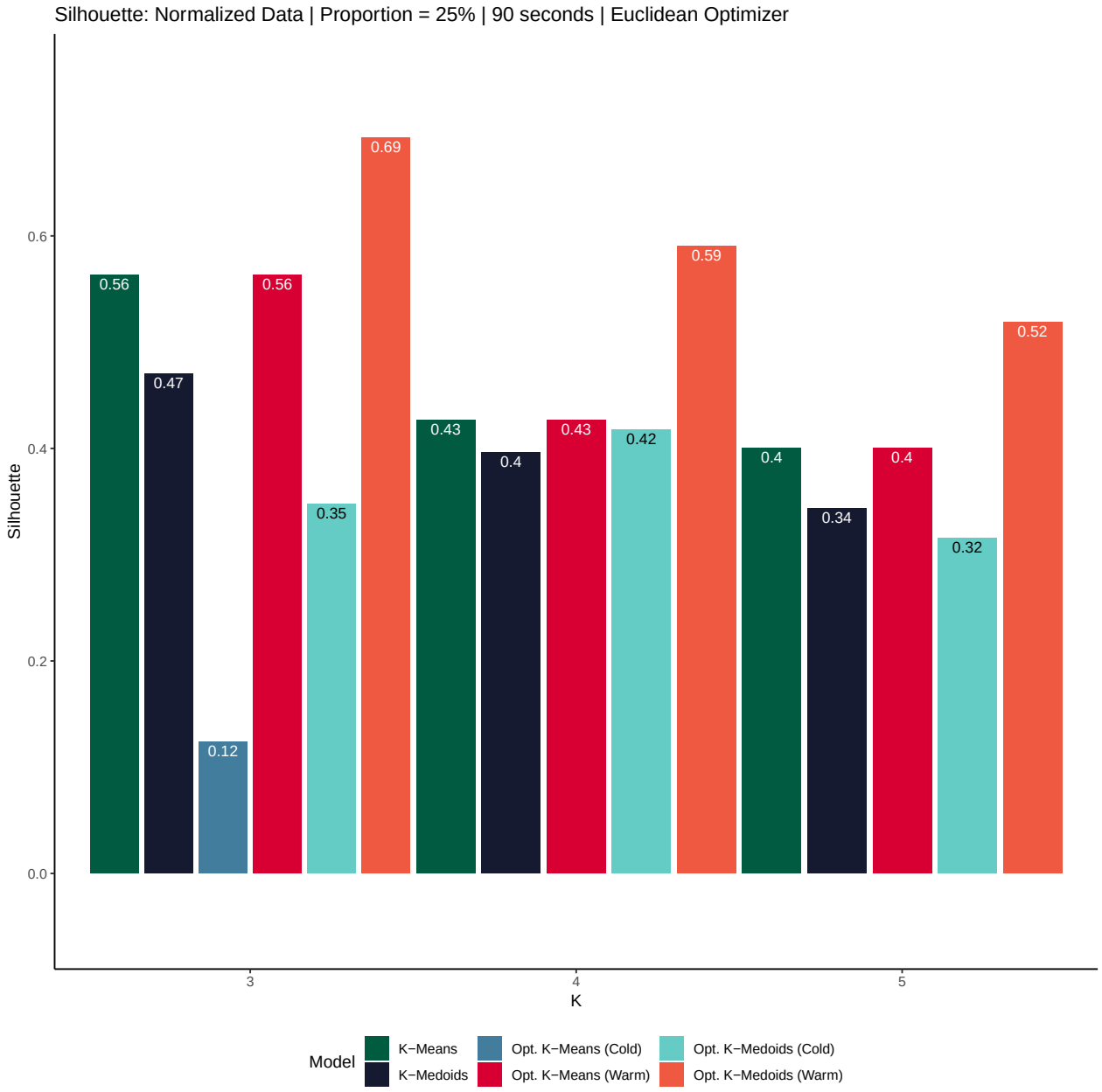

```
silhouette_individual(abalone_combined, "Normalized", 0.75, "Euclidean", 30, -0.05, 0.75)
```



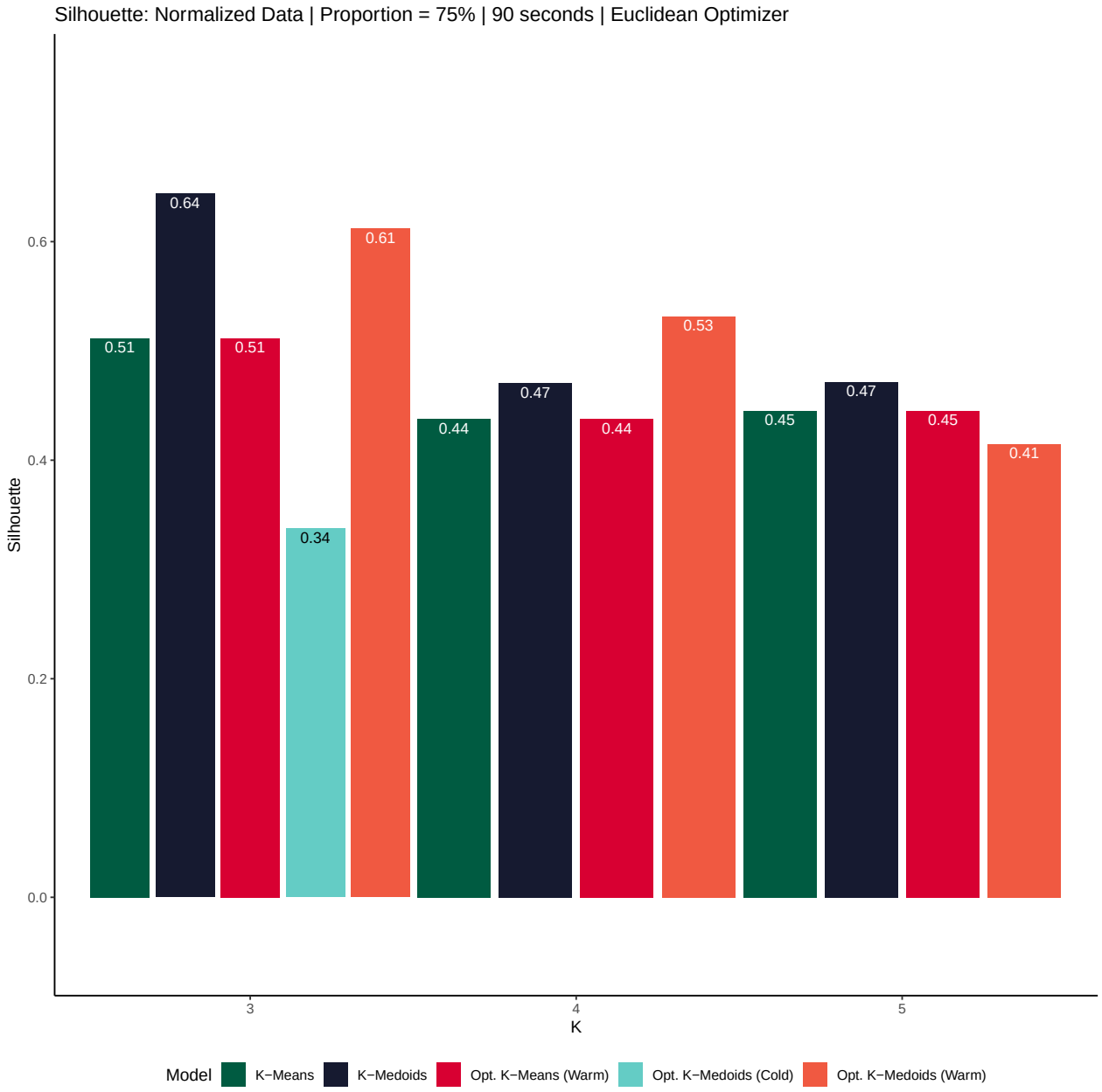

```
silhouette_individual(abalone_combined, "Normalized", 0.10, "Euclidean", 90, -0.05, 0.75)
```



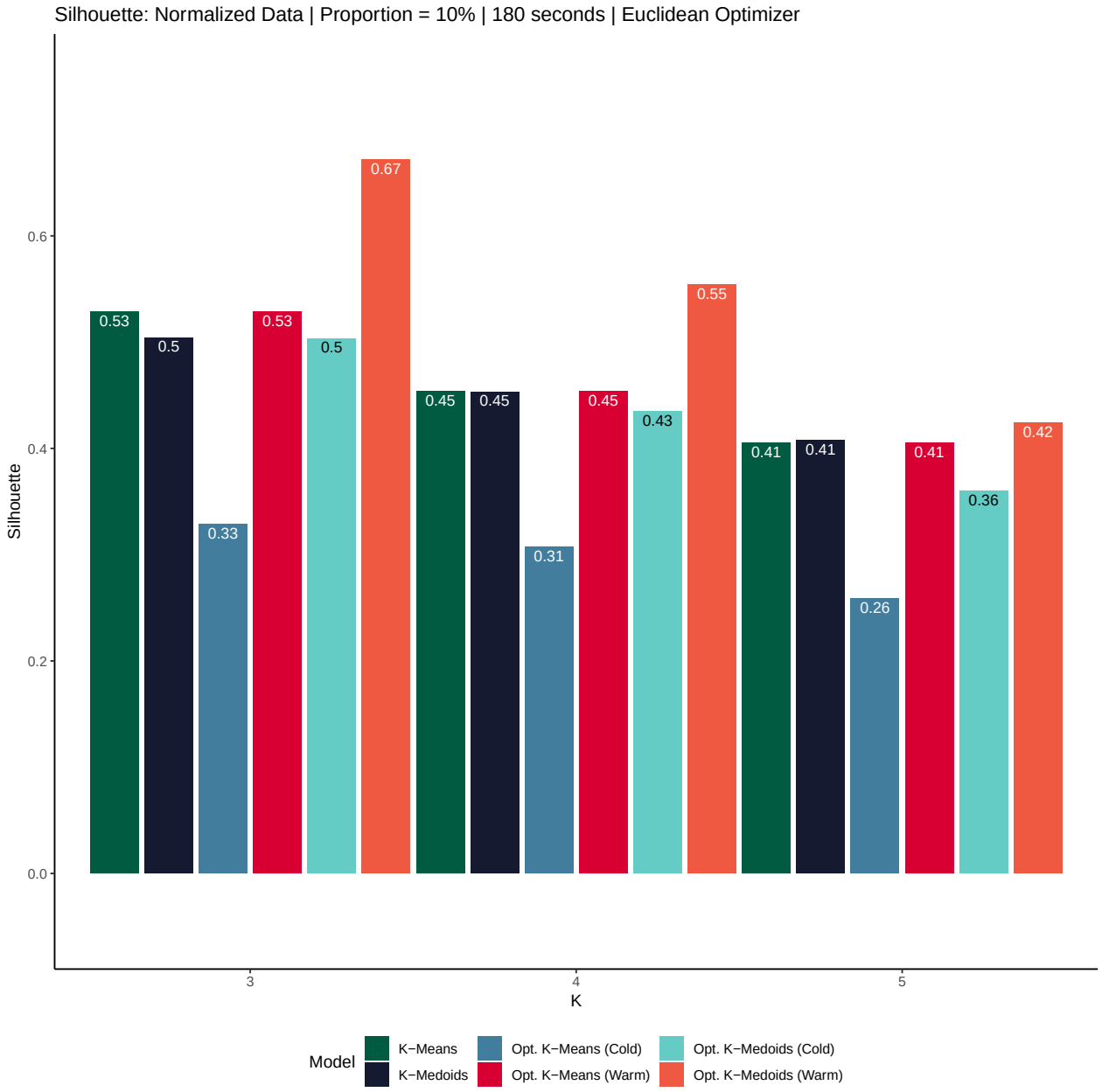

```
silhouette_individual(abalone_combined, "Normalized", 0.25, "Euclidean", 90, -0.05, 0.75)
```



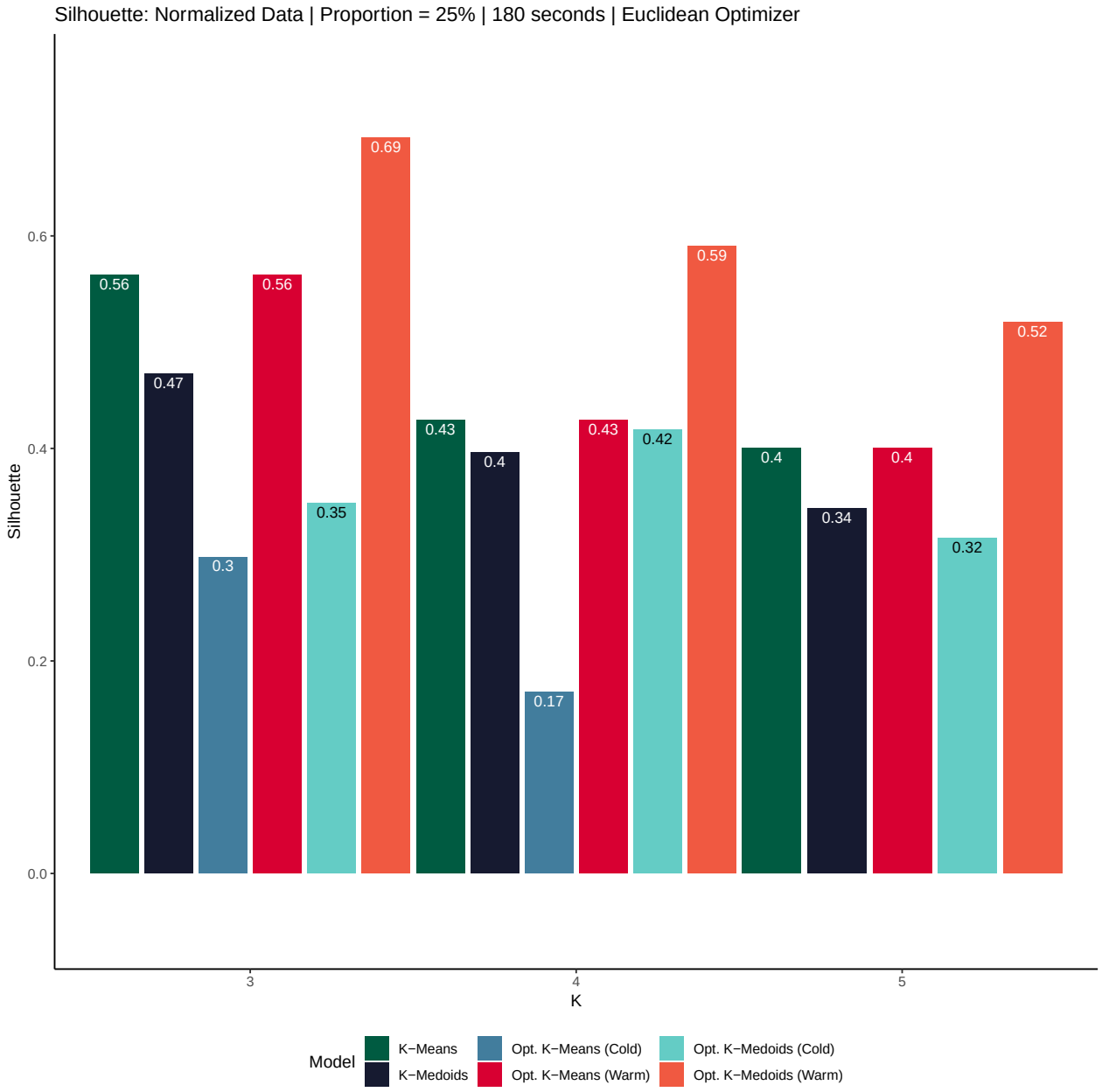

```
silhouette_individual(abalone_combined, "Normalized", 0.75, "Euclidean", 90, -0.05, 0.75)
```



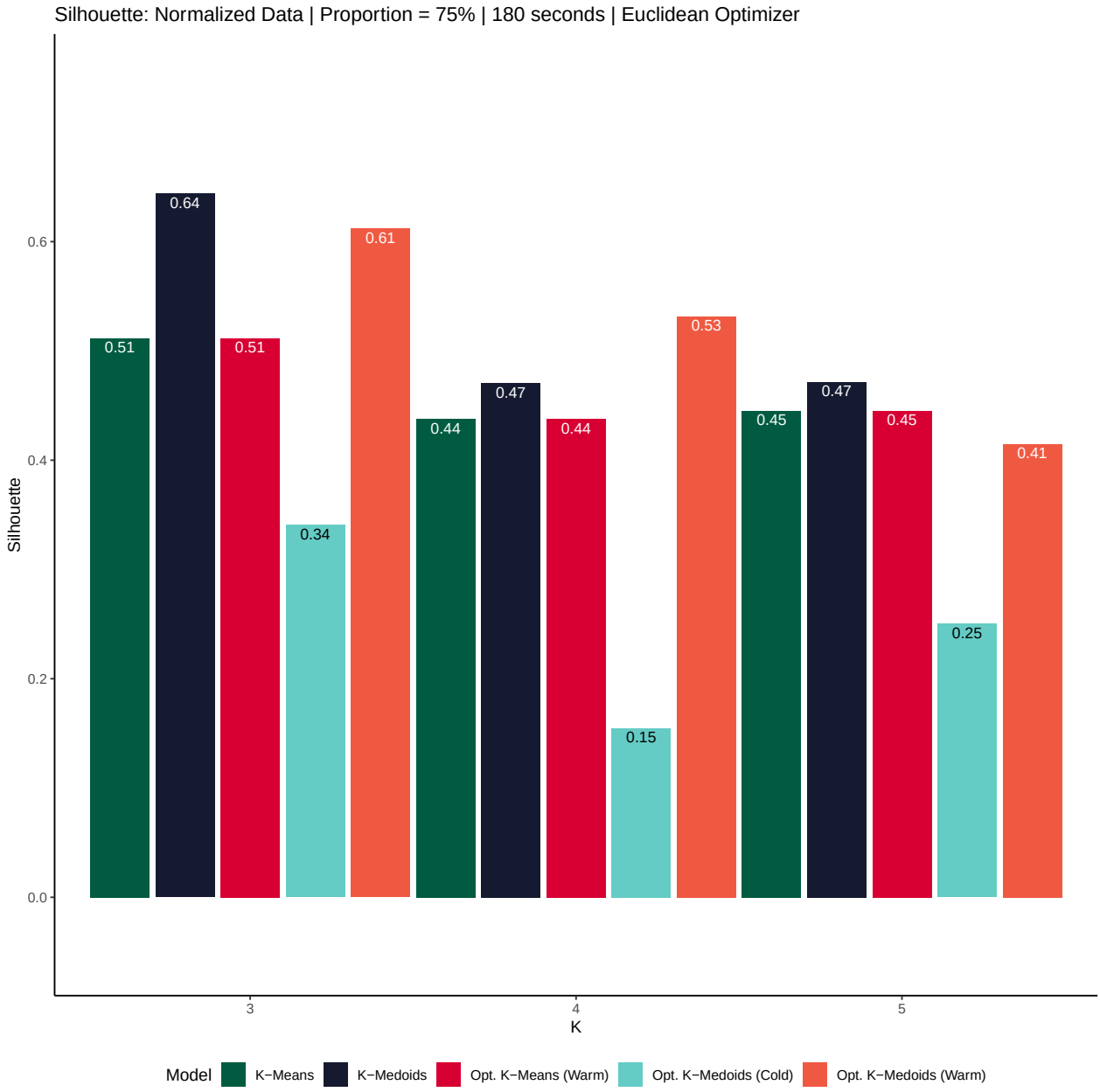

```
silhouette_individual(abalone_combined, "Normalized", 0.10, "Euclidean", 180, -0.05, 0.75)
```




```
silhouette_individual(abalone_combined, "Normalized", 0.25, "Euclidean", 180, -0.05, 0.75)
```

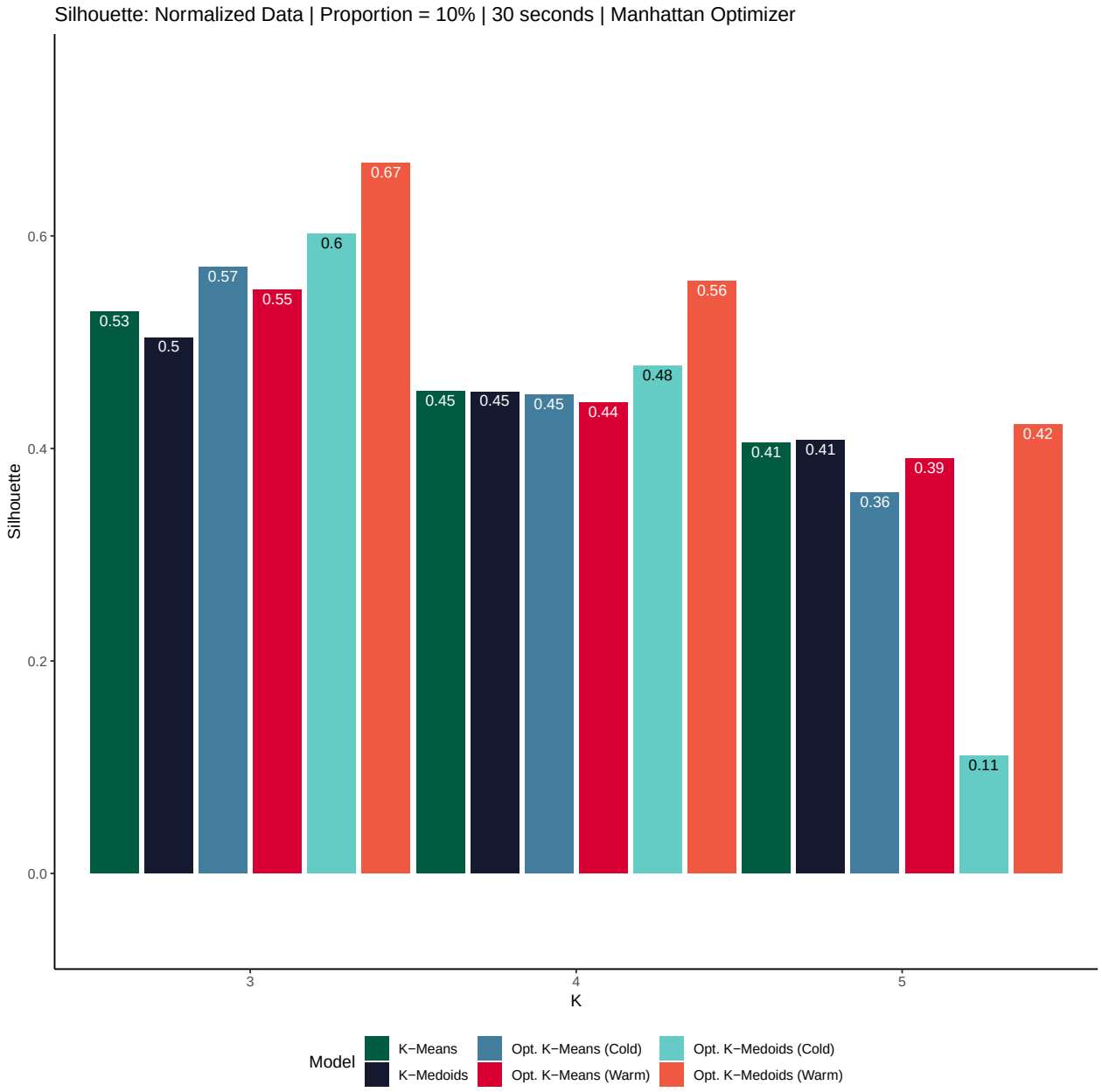



```
silhouette_individual(abalone_combined, "Normalized", 0.75, "Euclidean", 180, -0.05, 0.75)
```

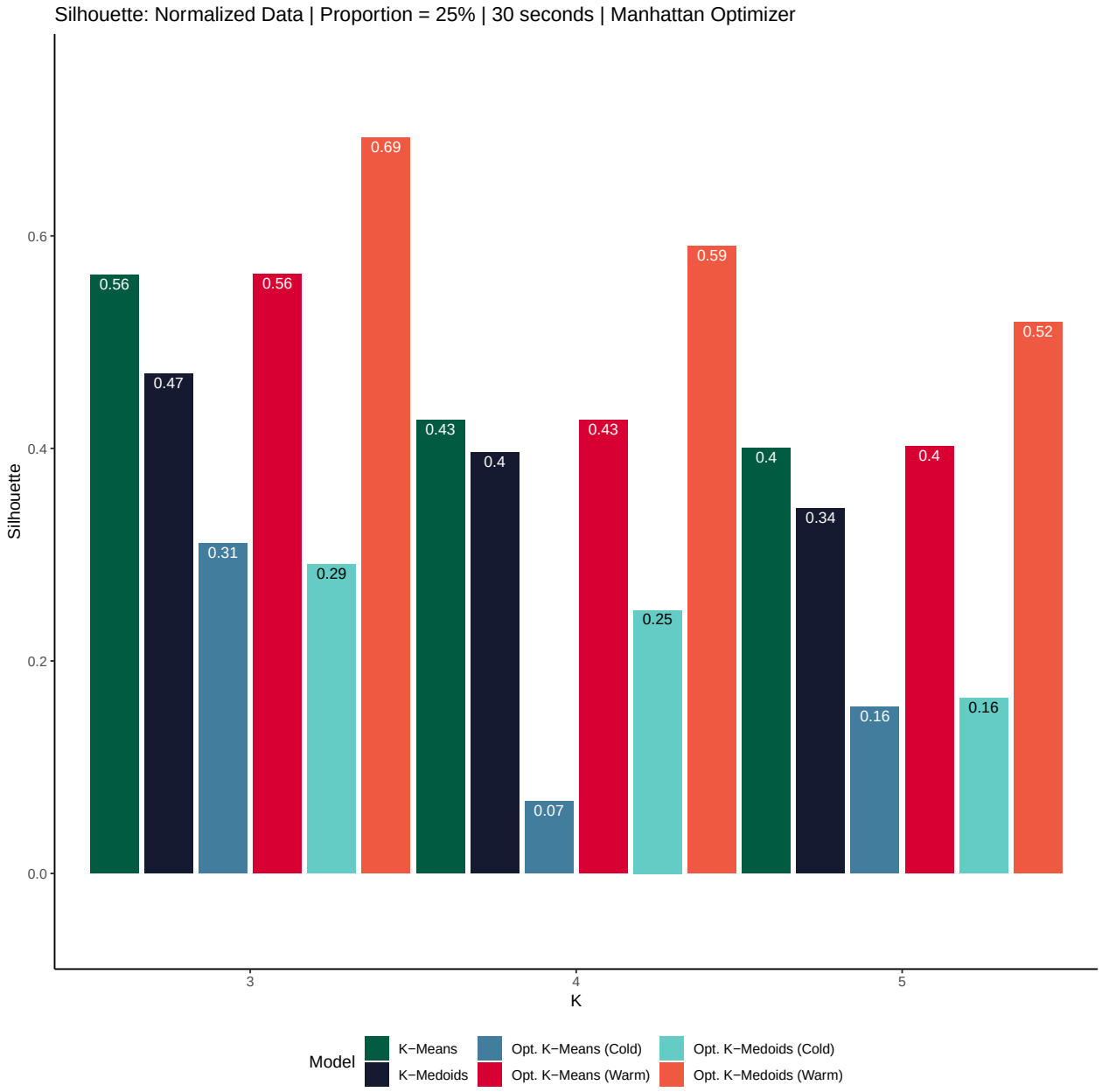


Individual Manhattan:

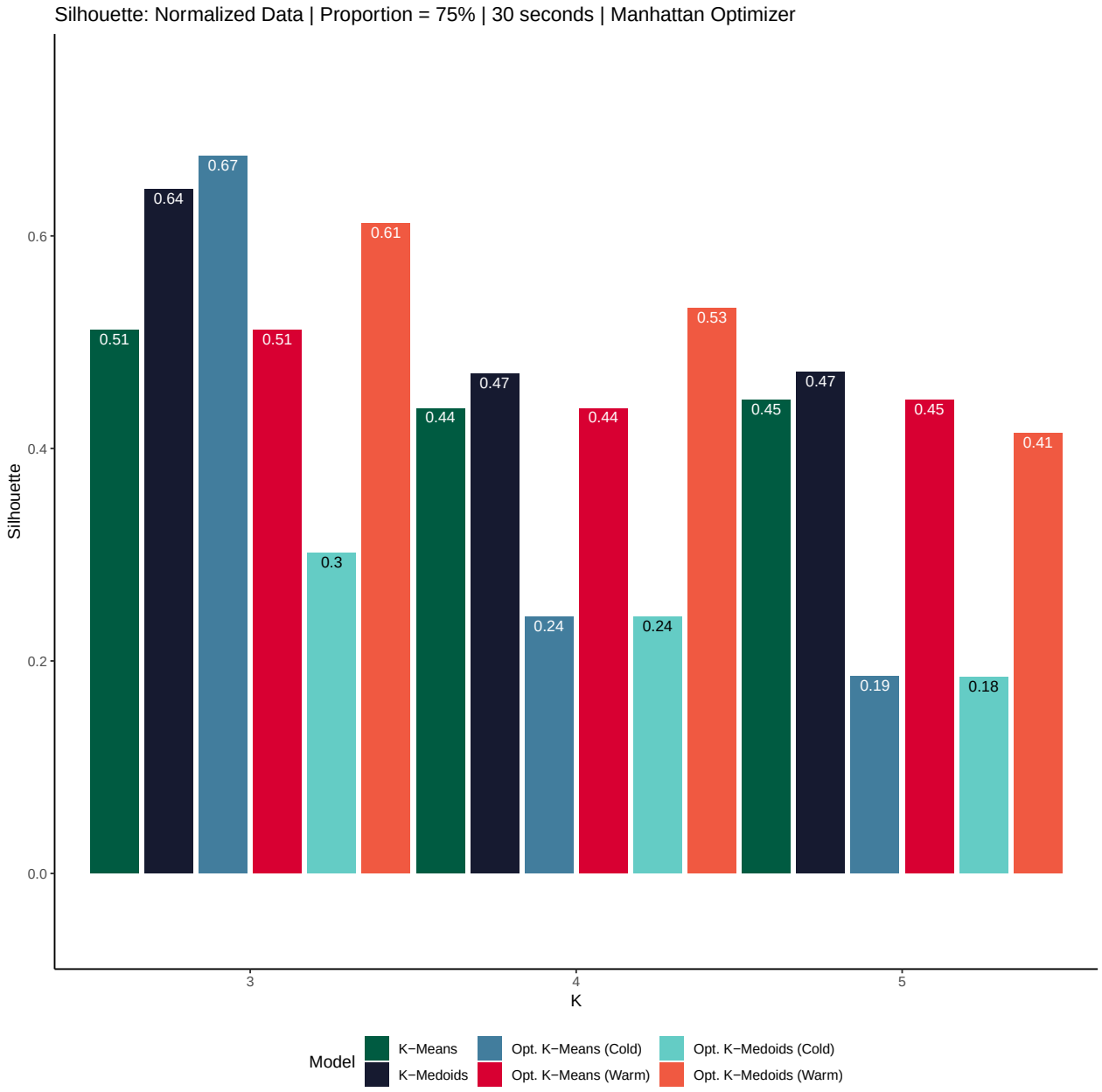
```
silhouette_individual(abalone_combined, "Normalized", 0.10, "Manhattan", 30, -0.05, 0.75)
```



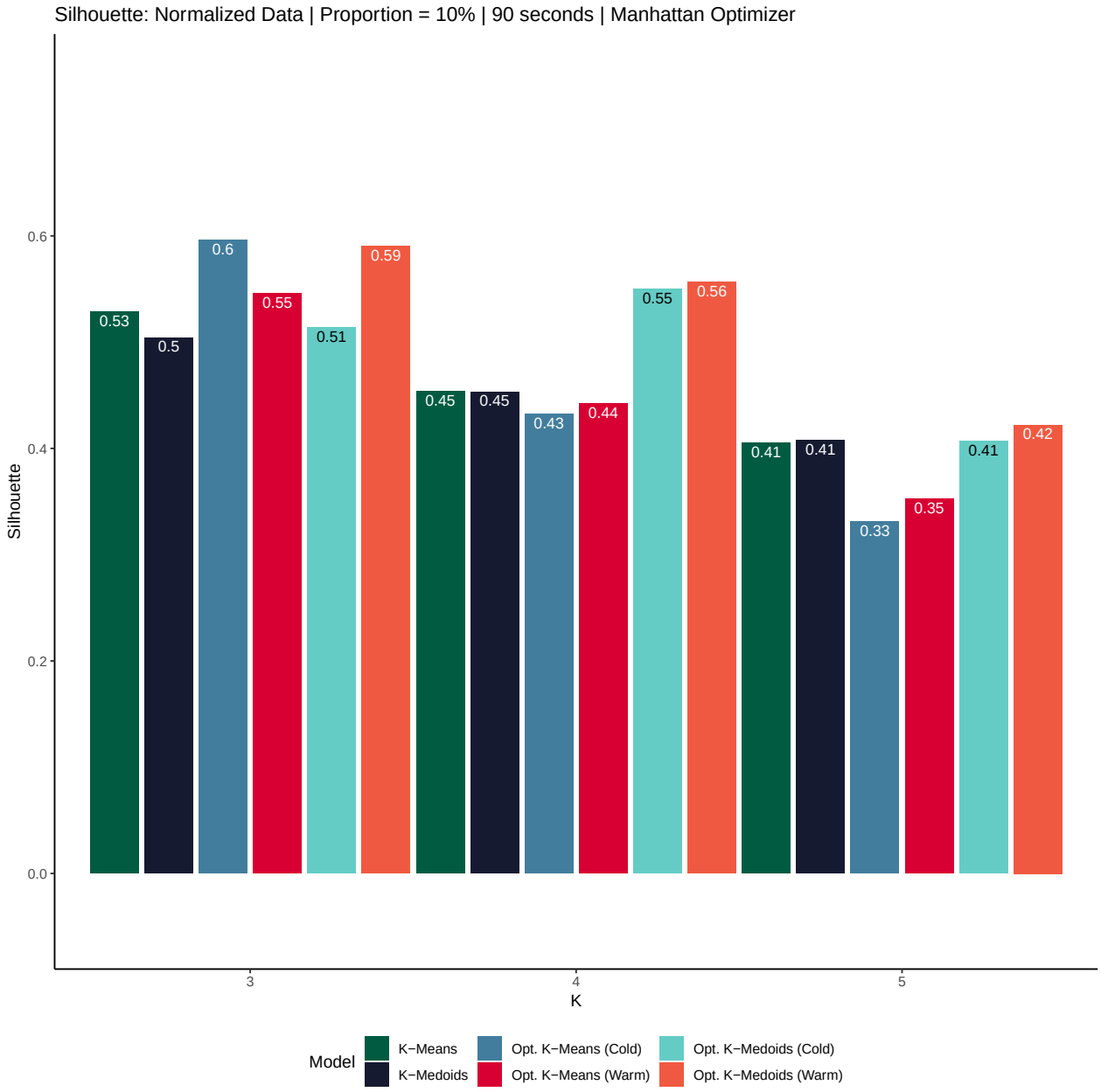

```
silhouette_individual(abalone_combined, "Normalized", 0.25, "Manhattan", 30, -0.05, 0.75)
```



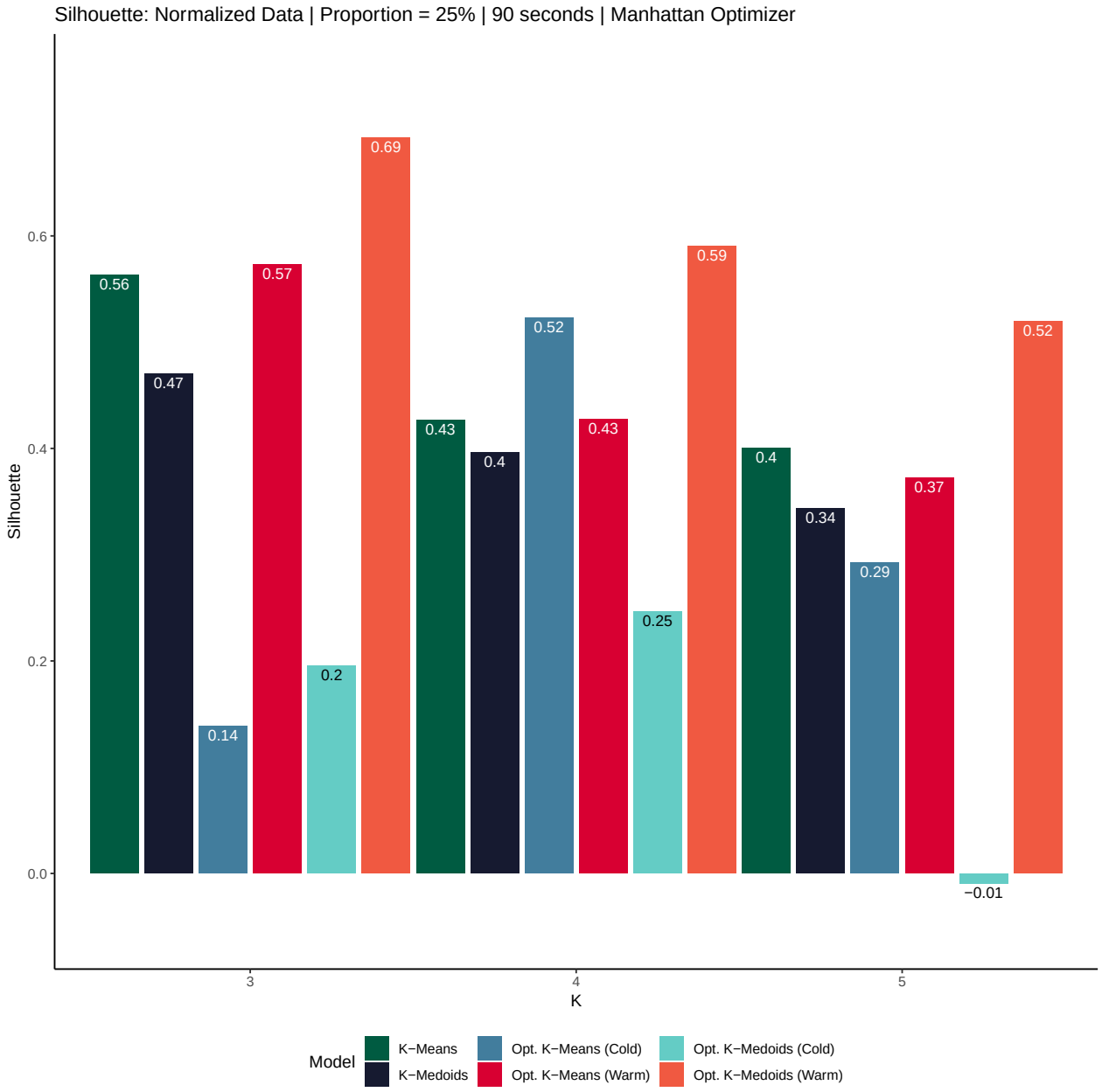

```
silhouette_individual(abalone_combined, "Normalized", 0.75, "Manhattan", 30, -0.05, 0.75)
```



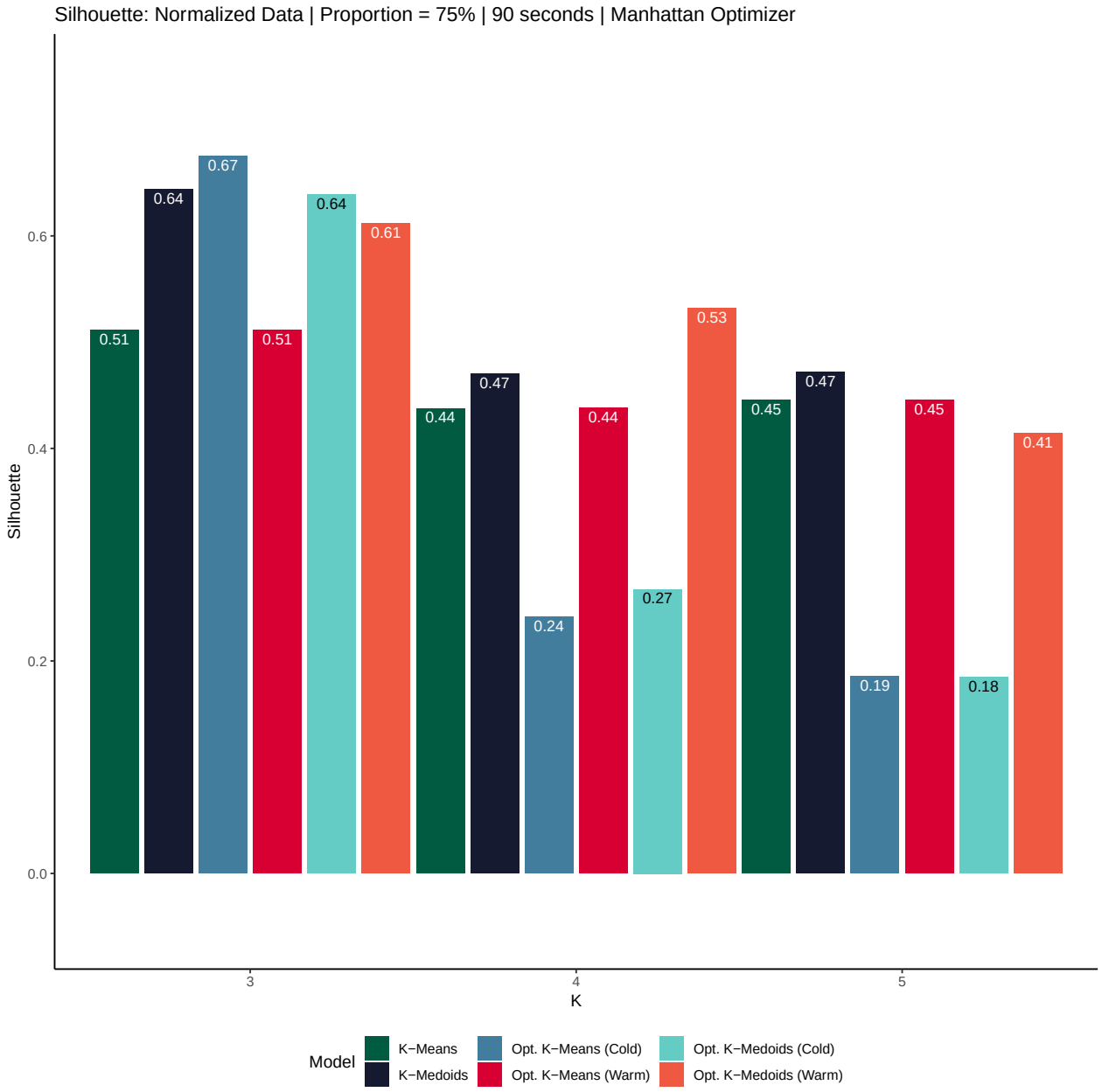

```
silhouette_individual(abalone_combined, "Normalized", 0.10, "Manhattan", 90, -0.05, 0.75)
```



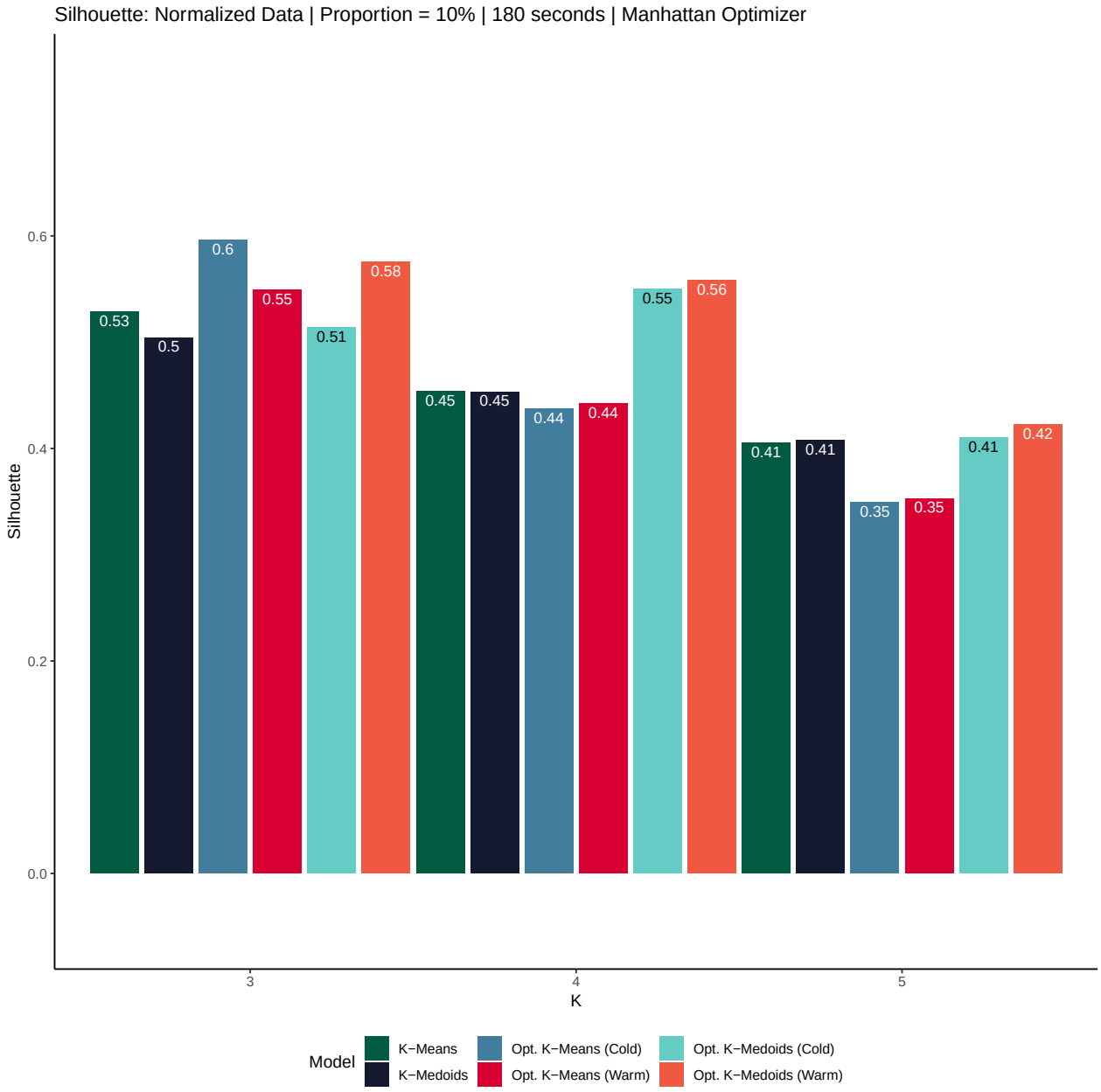

```
silhouette_individual(abalone_combined, "Normalized", 0.25, "Manhattan", 90, -0.05, 0.75)
```



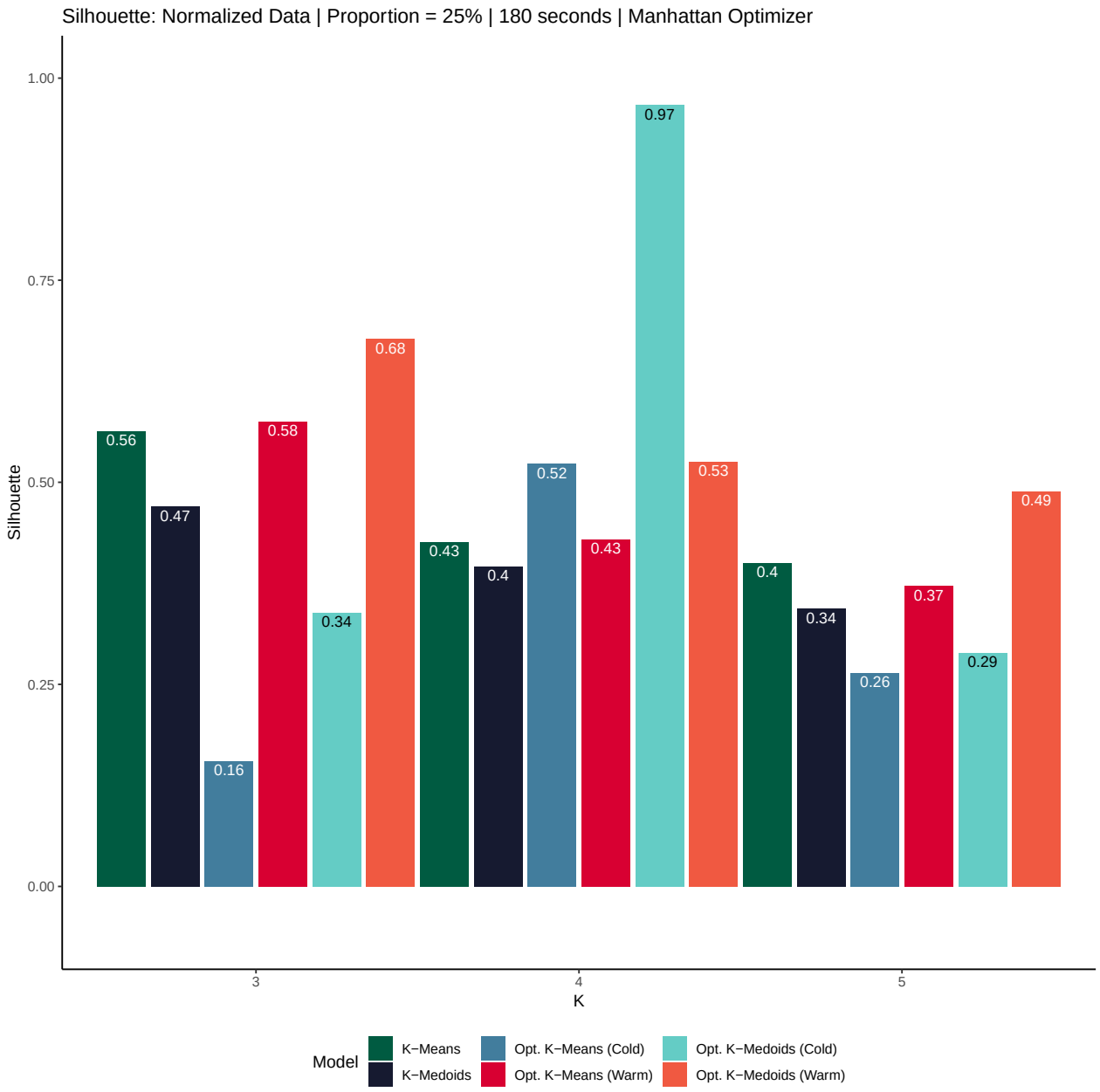

```
silhouette_individual(abalone_combined, "Normalized", 0.75, "Manhattan", 90, -0.05, 0.75)
```



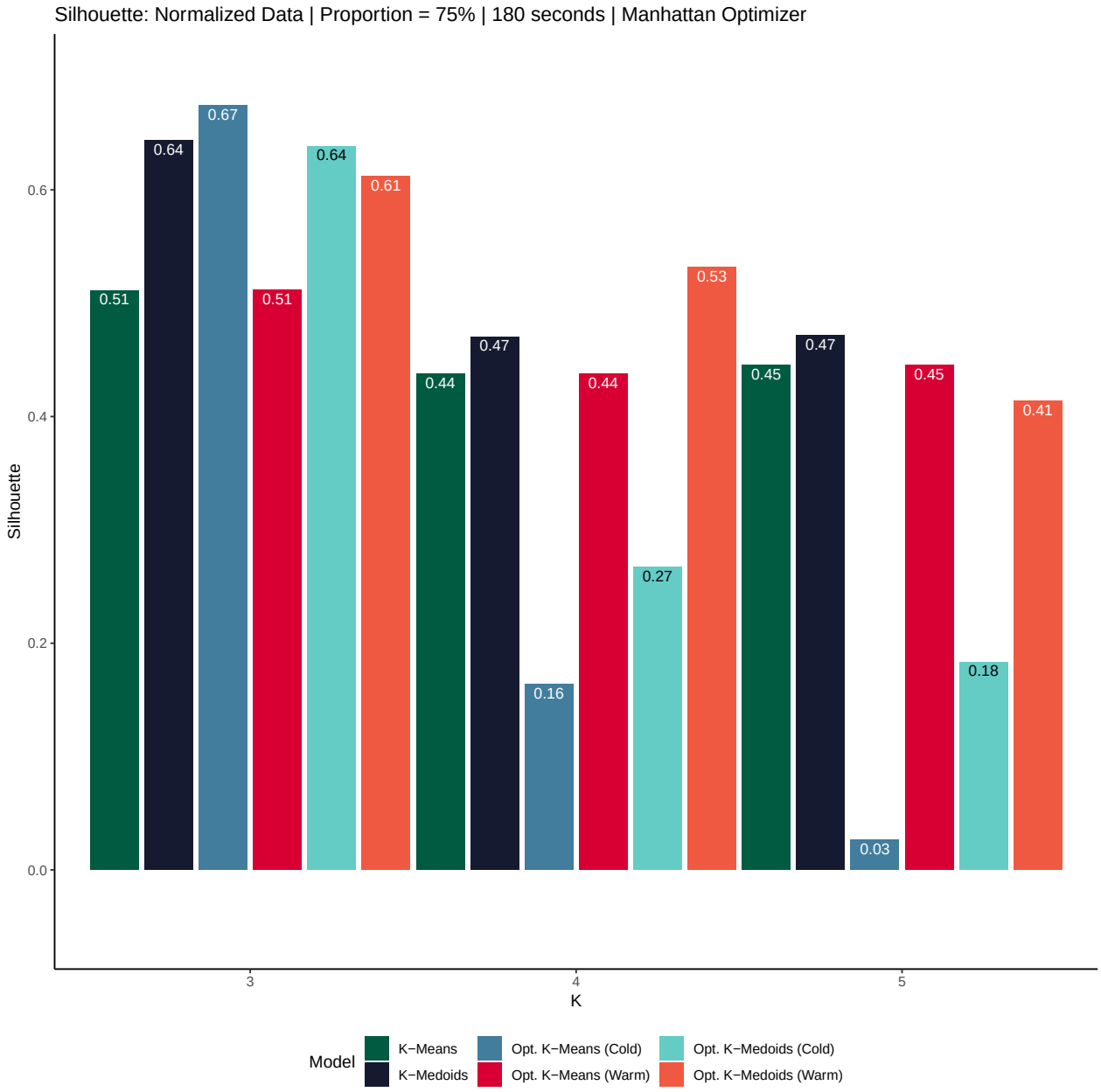

```
silhouette_individual(abalone_combined, "Normalized", 0.10, "Manhattan", 180, -0.05, 0.75)
```




```
silhouette_individual(abalone_combined, "Normalized", 0.25, "Manhattan", 180, -0.05, 1.00)
```



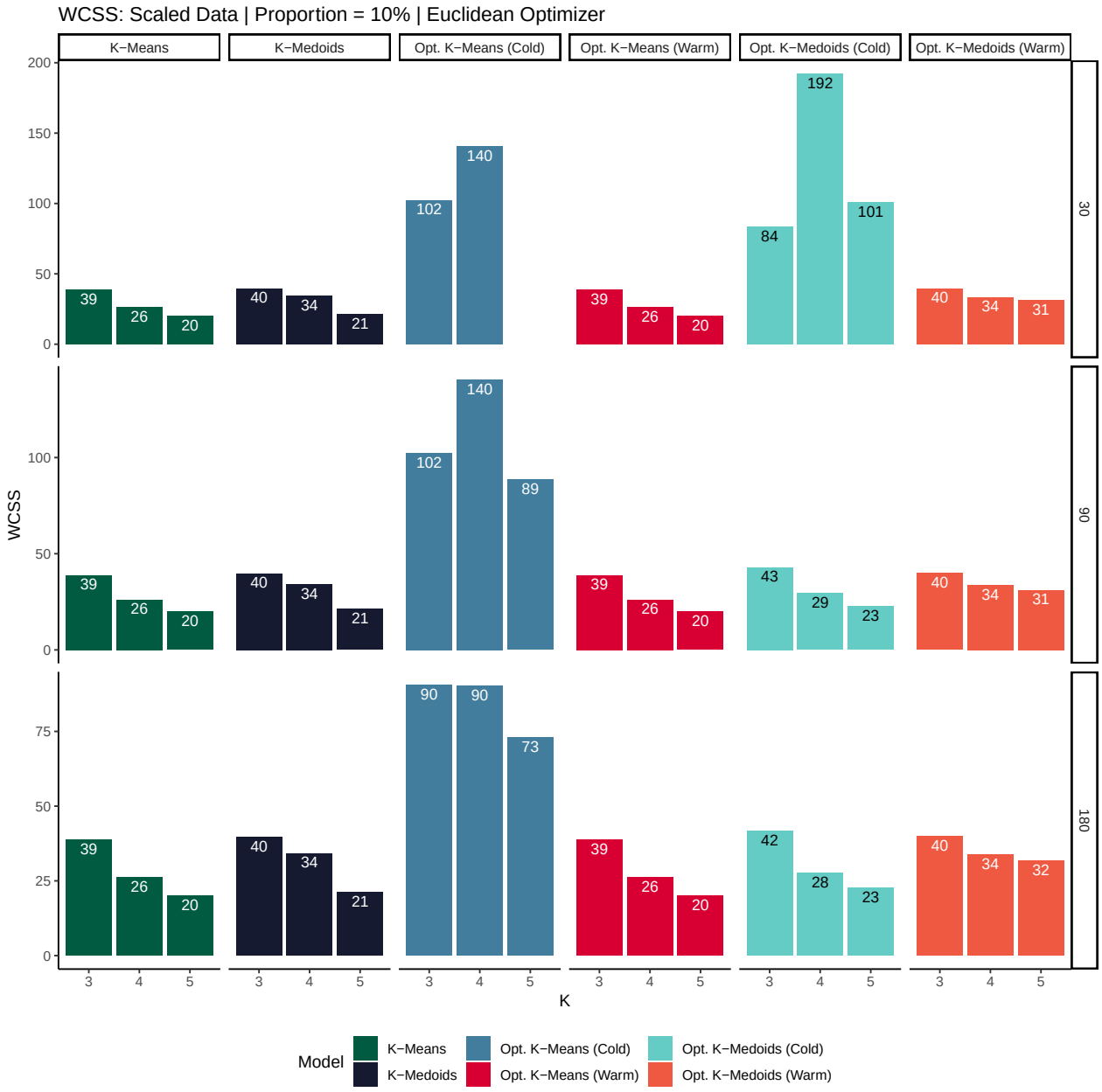

```
silhouette_individual(abalone_combined, "Normalized", 0.75, "Manhattan", 180, -0.05, 0.70)
```



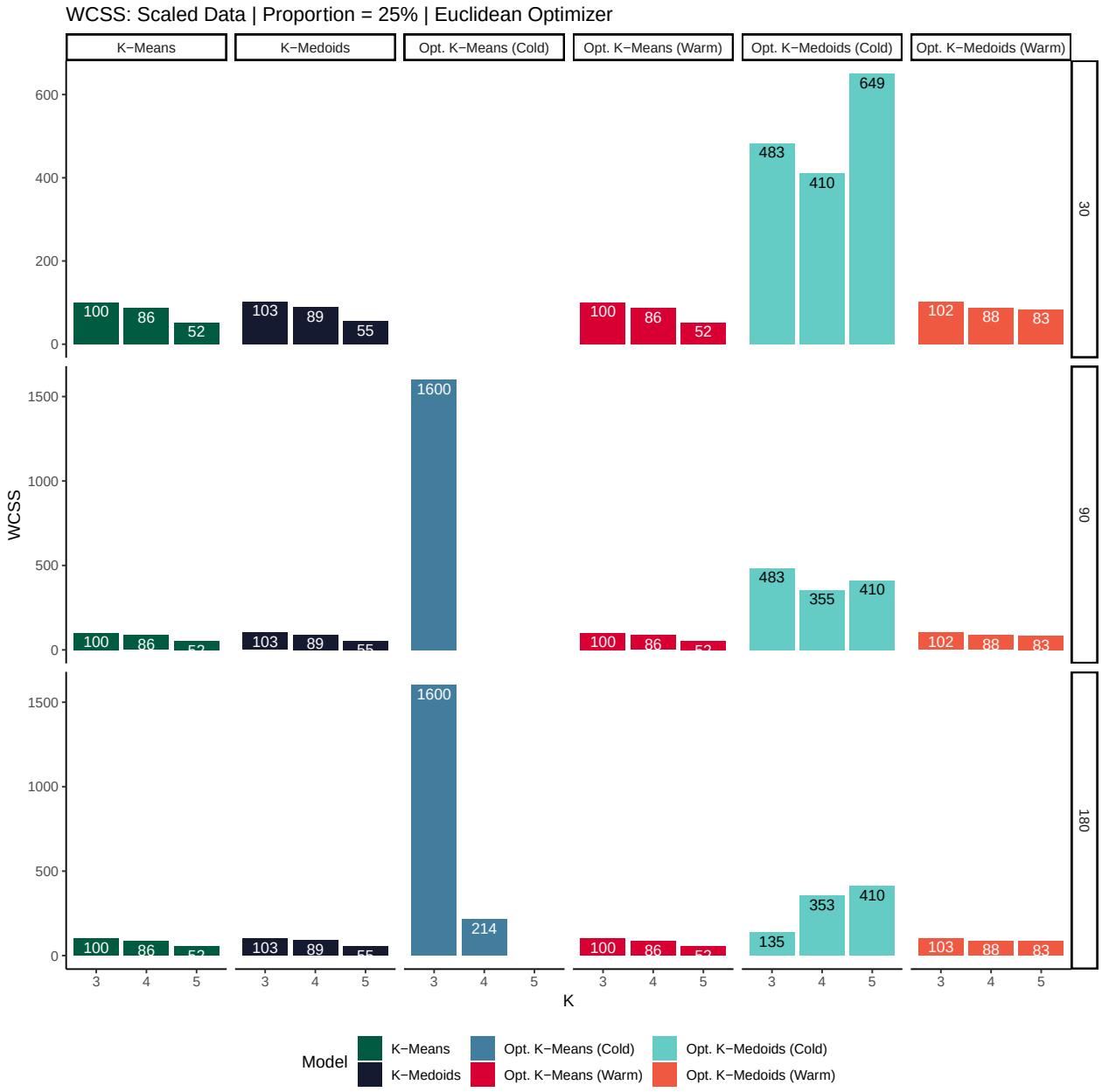
WCSS Scaled Plots:

Euclidean:

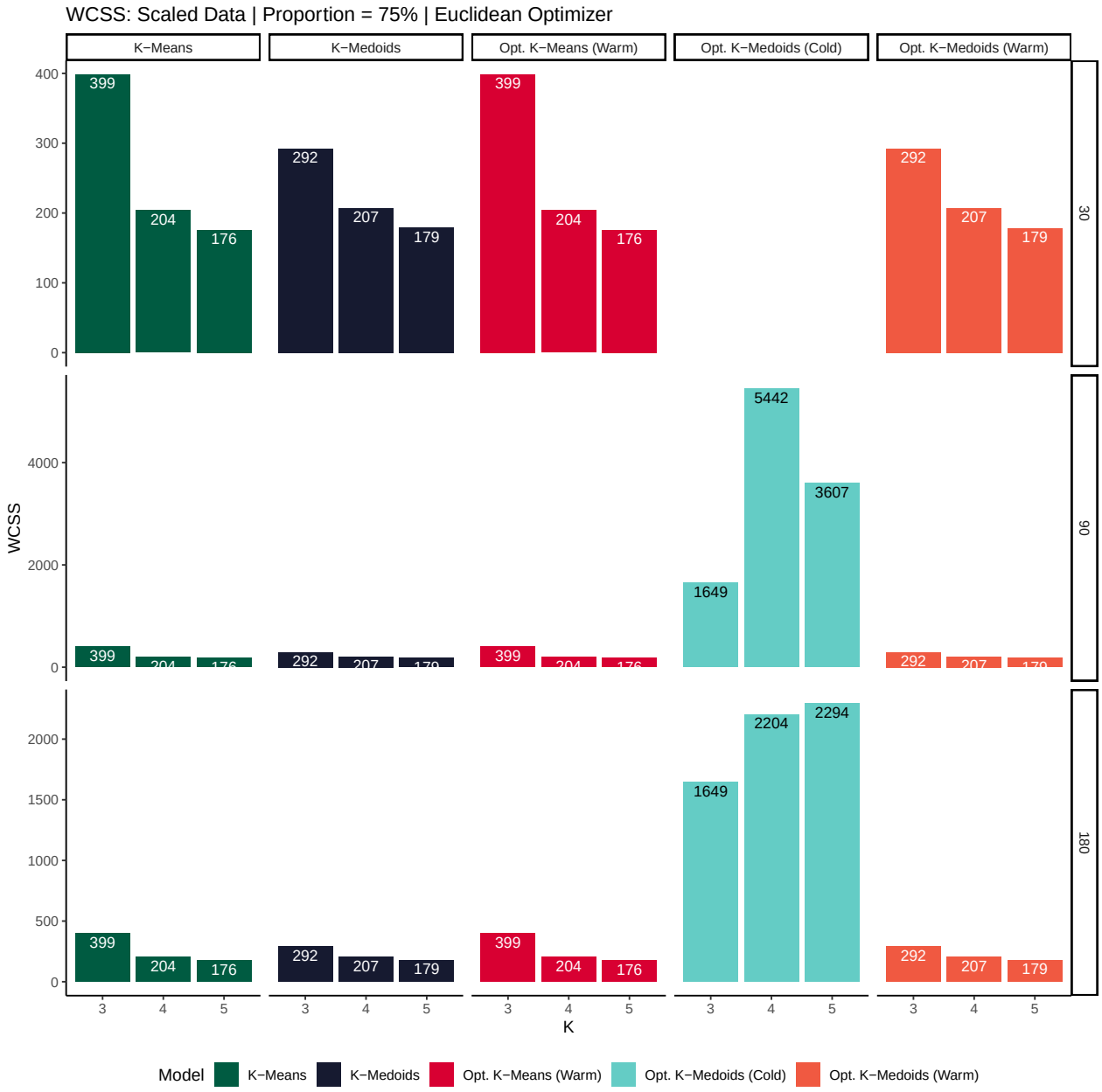
```
wcss_grouped(abalone_combined, "Scaled", 0.10, "Euclidean", y_scale="free")
```




```
wcss_grouped(abalone_combined, "Scaled", 0.25, "Euclidean", y_scale="free")
```

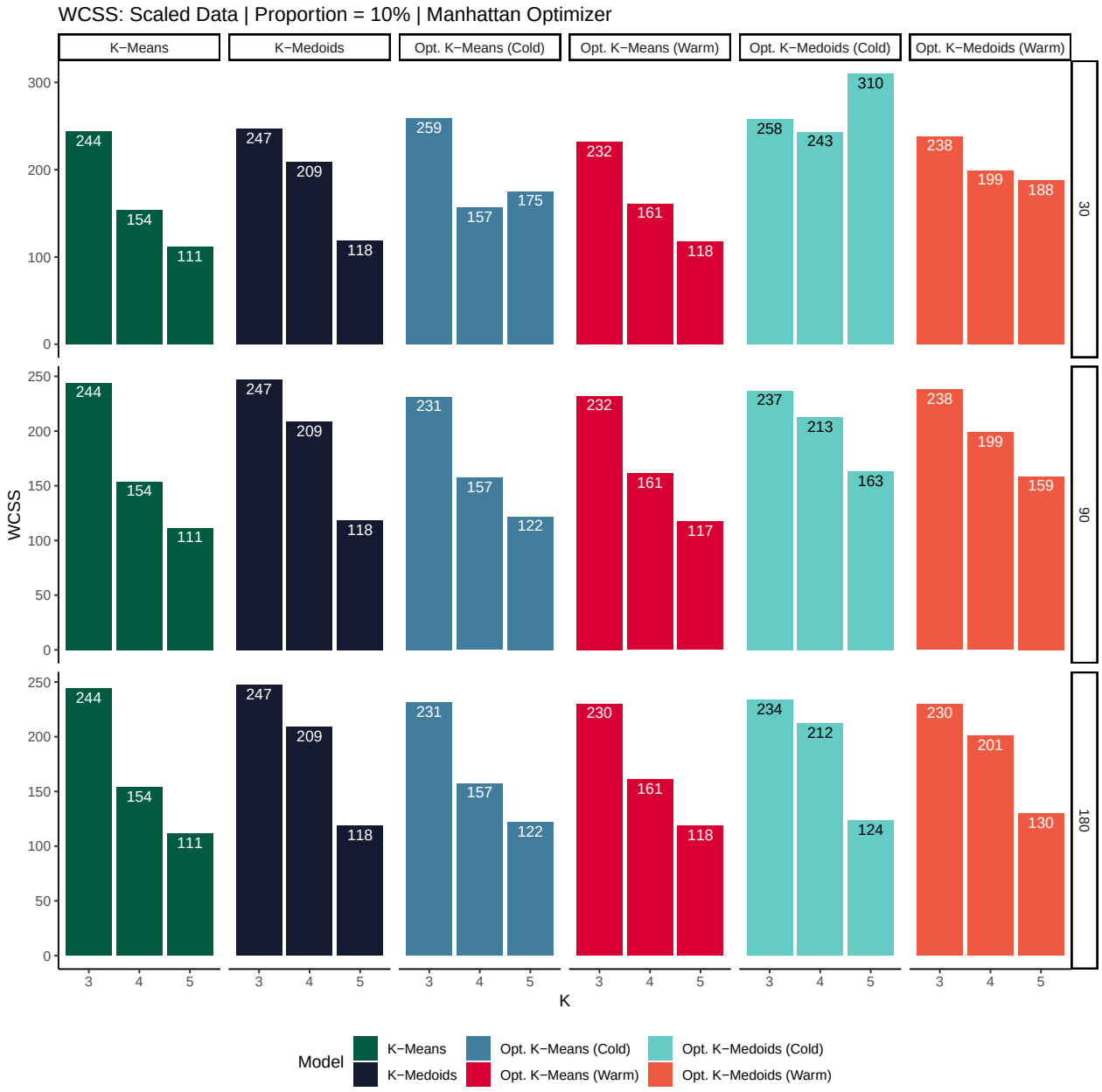



```
wcss_grouped(abalone_combined, "Scaled", 0.75, "Euclidean", y_scale="free")
```

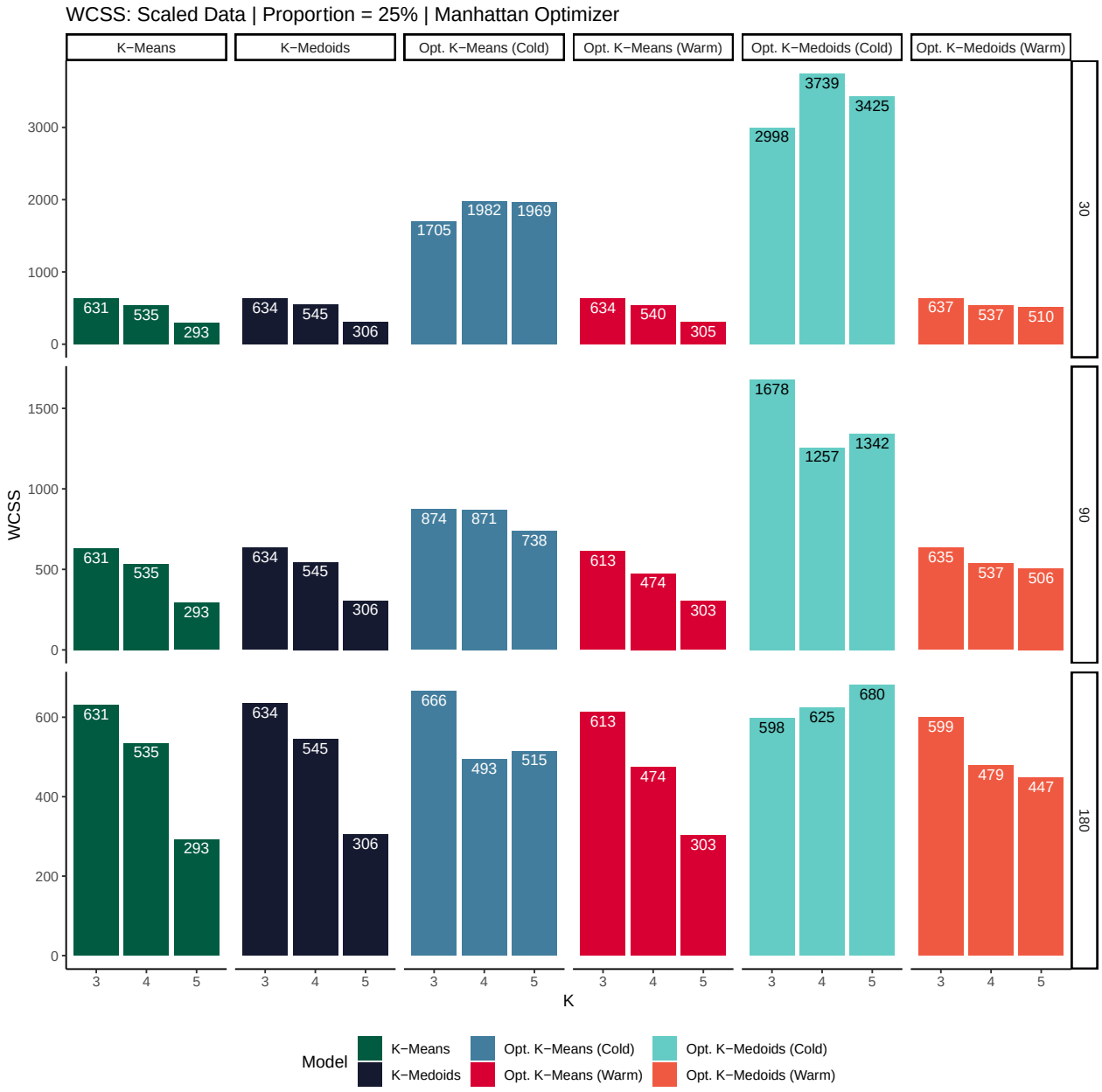


Manhattan:

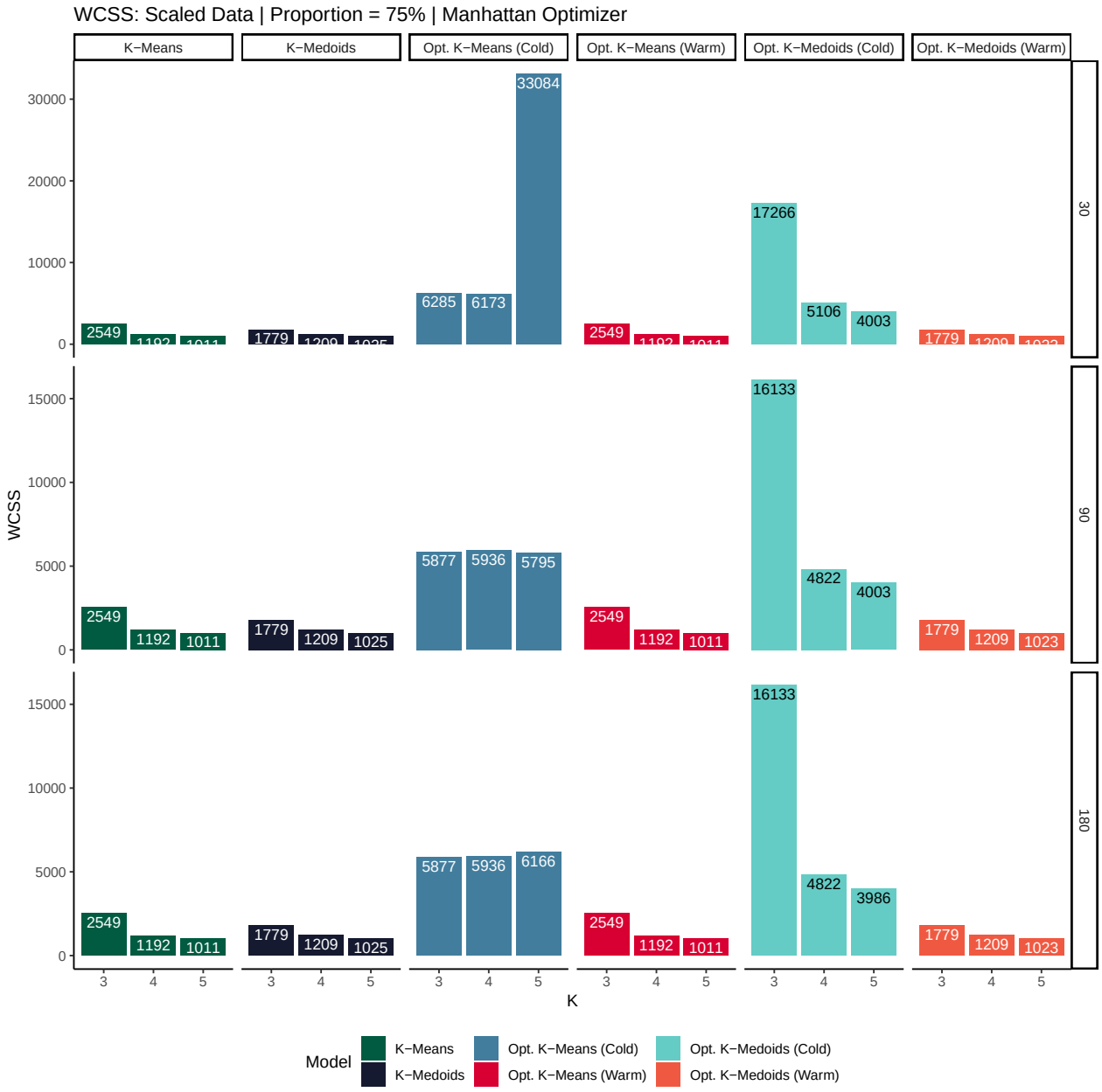
```
wcss_grouped(abalone_combined, "Scaled", 0.10, "Manhattan", y_scale="free")
```




```
wcss_grouped(abalone_combined, "Scaled", 0.25, "Manhattan", y_scale="free")
```

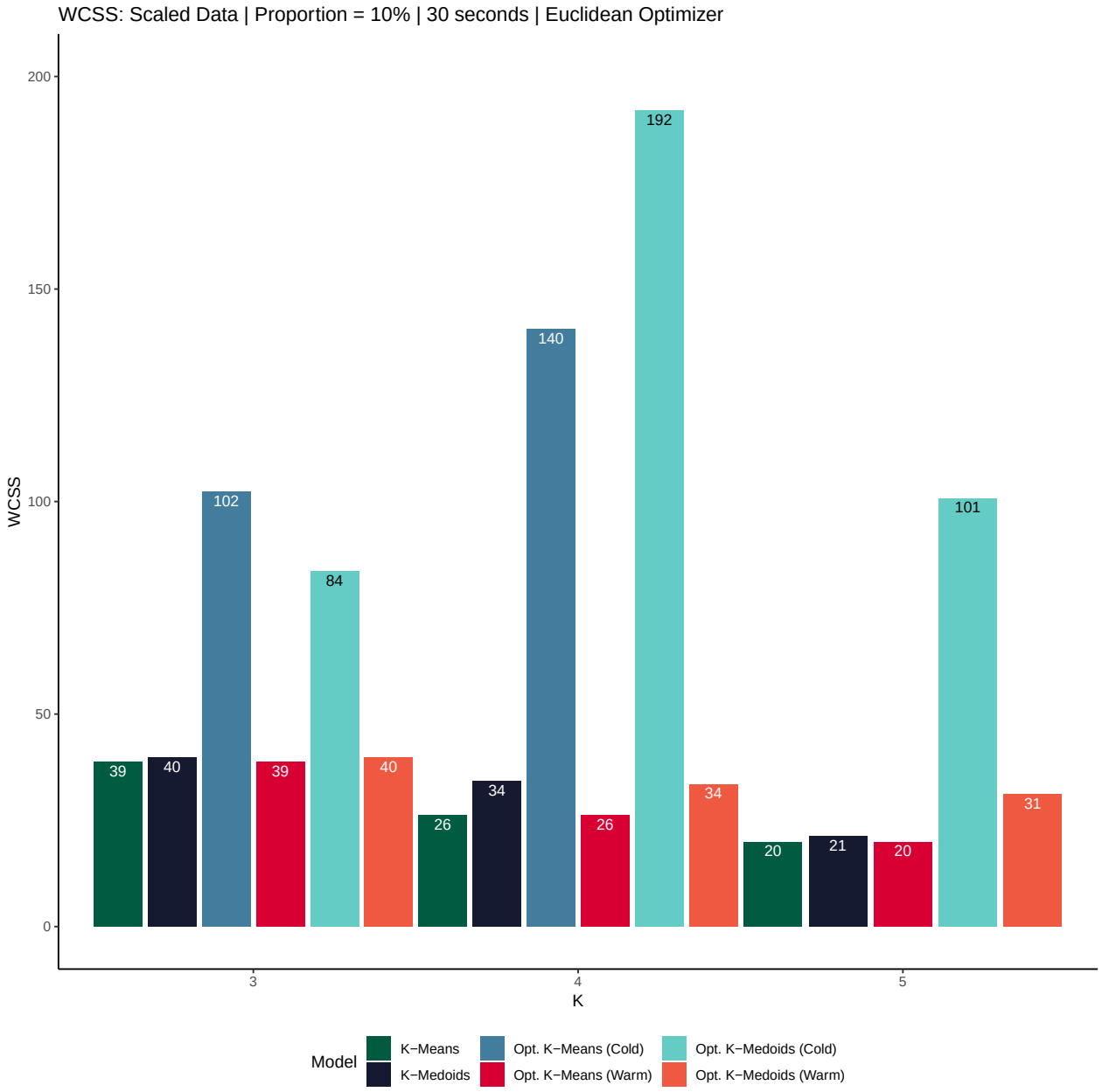



```
wcss_grouped(abalone_combined, "Scaled", 0.75, "Manhattan", y_scale="free")
```

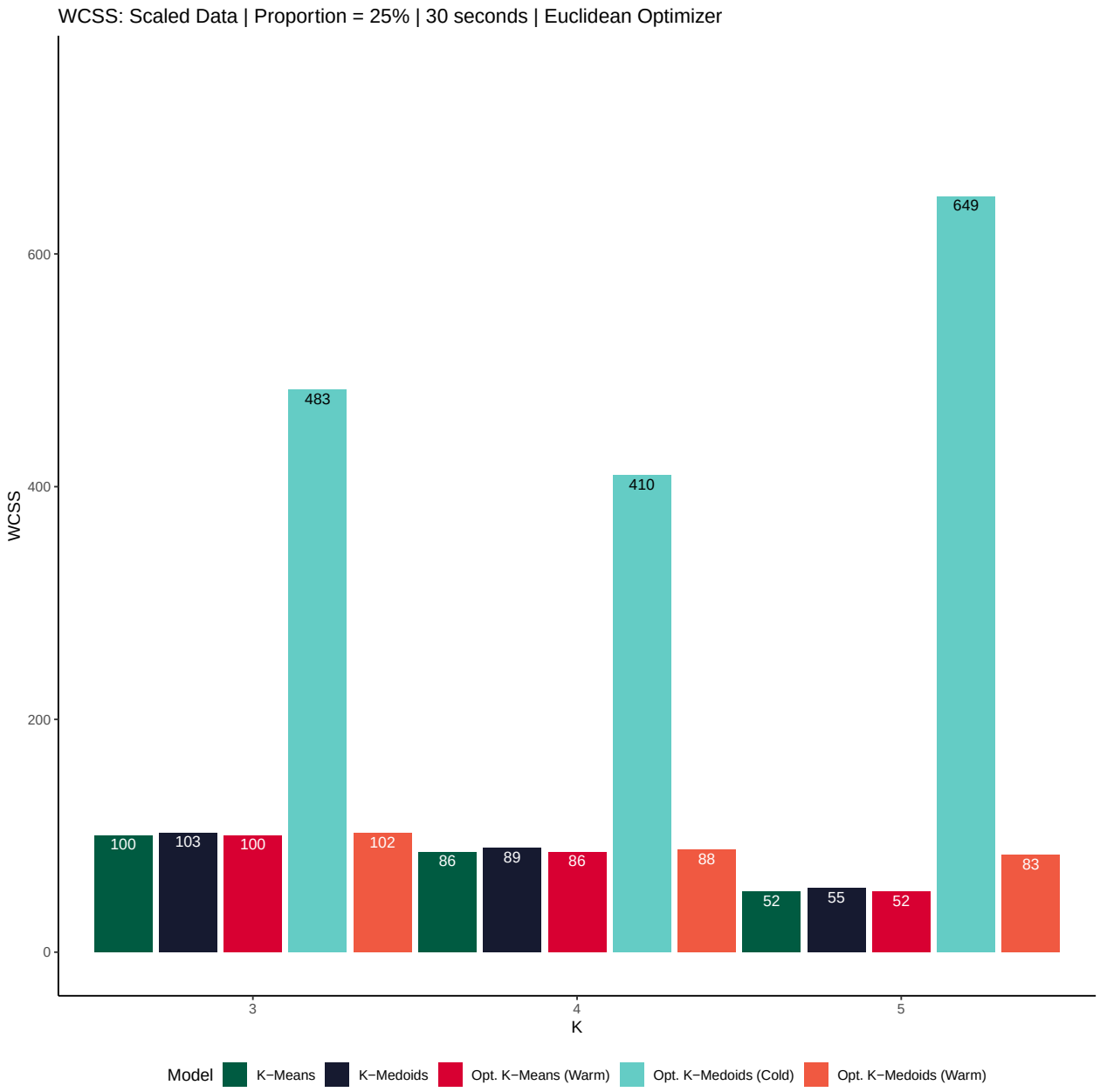


Individual Euclidean:

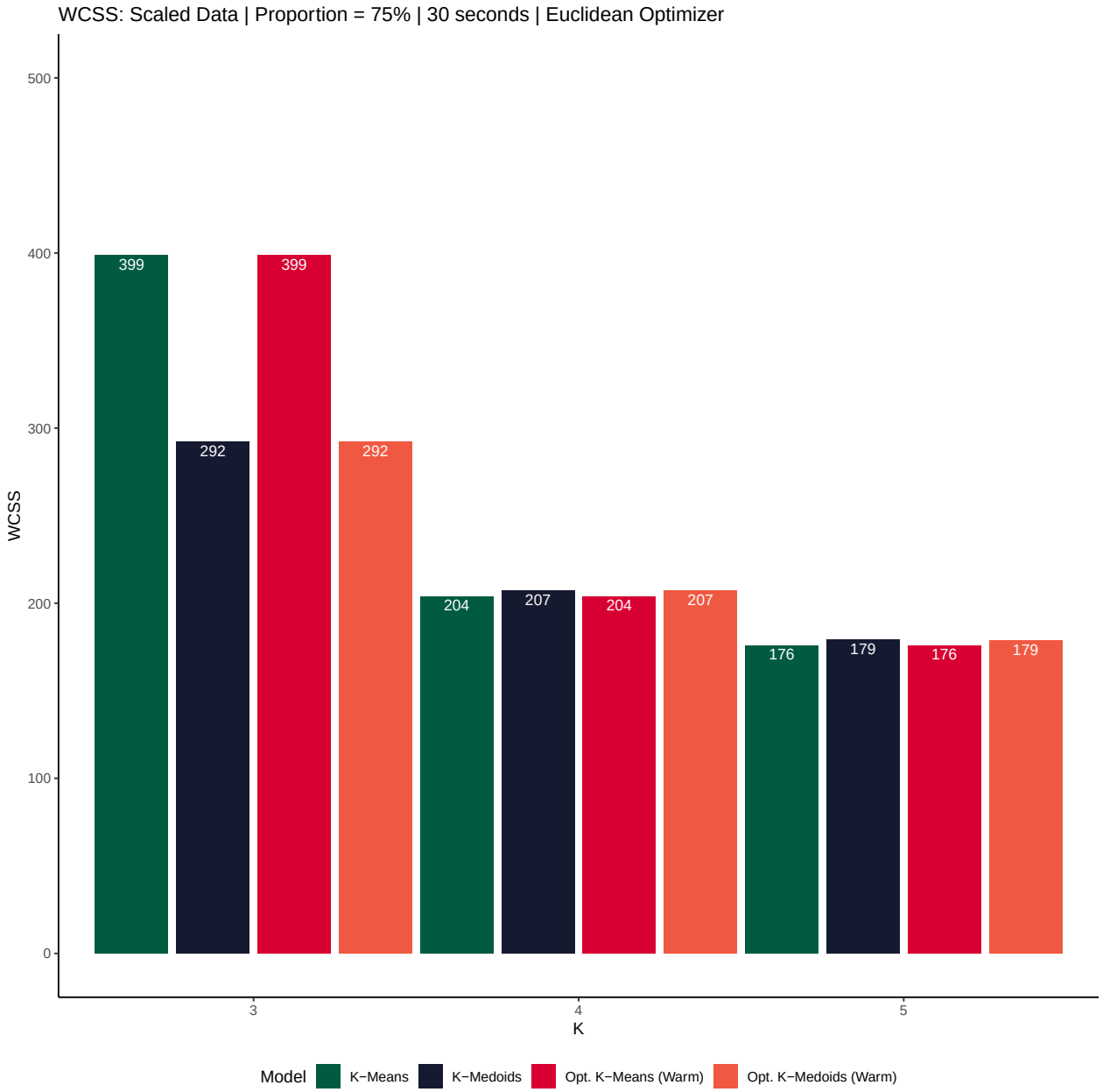
```
wcss_individual(abalone_combined, "Scaled", 0.10, "Euclidean", 30, 0, 200)
```



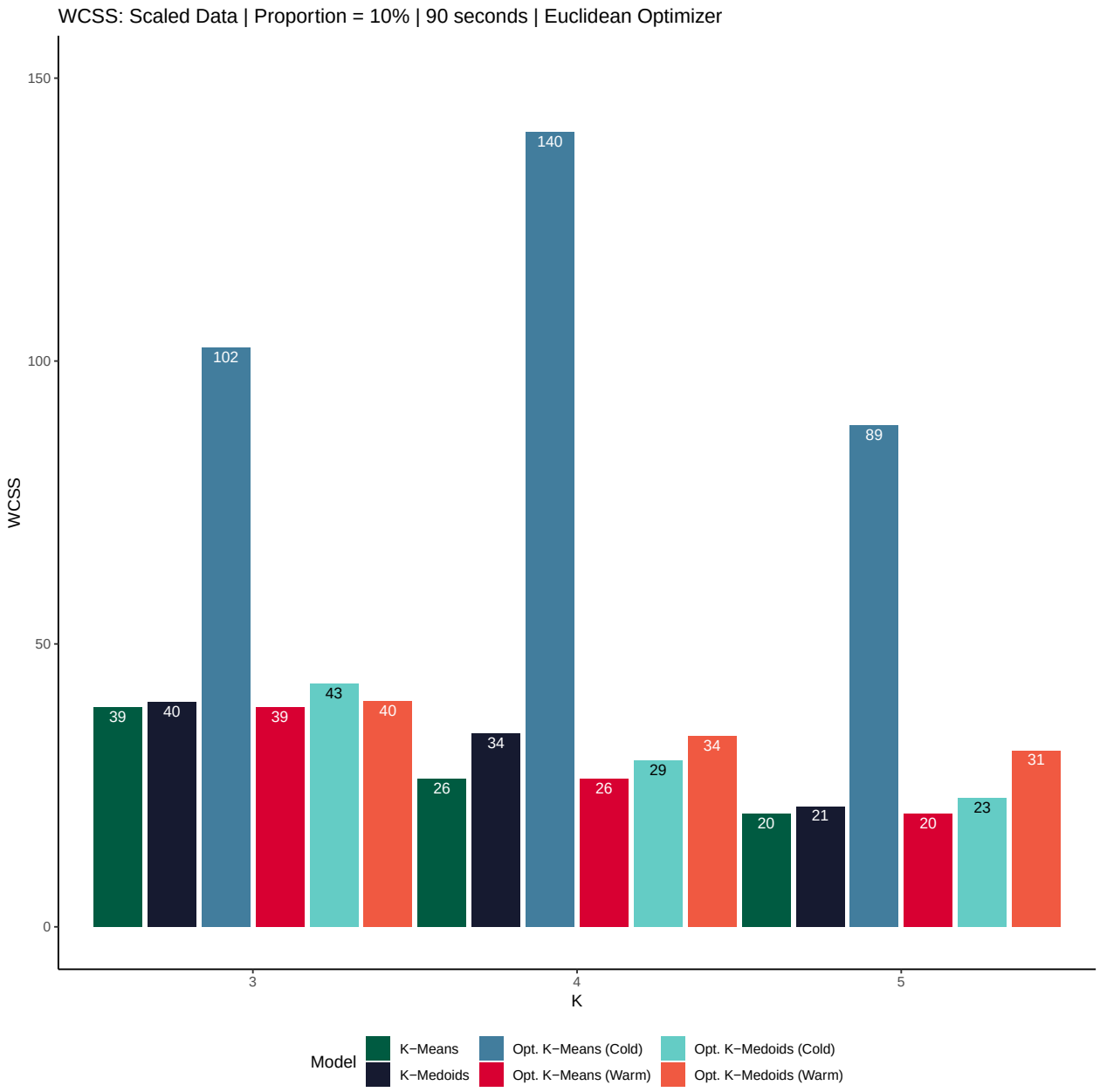

```
wcss_individual(abalone_combined, "Scaled", 0.25, "Euclidean", 30, 0, 750)
```



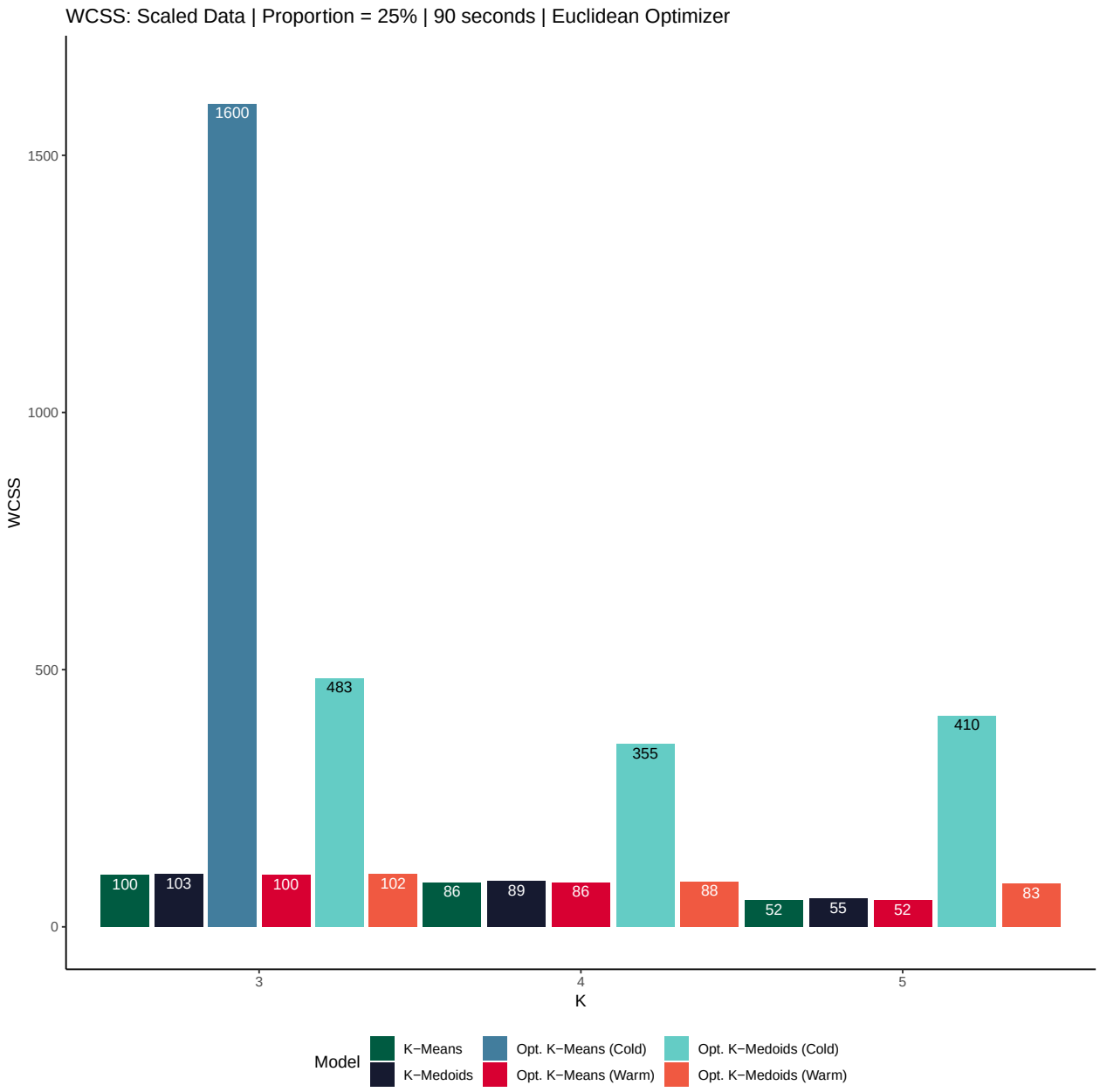

```
wcss_individual(abalone_combined, "Scaled", 0.75, "Euclidean", 30, 0, 500)
```



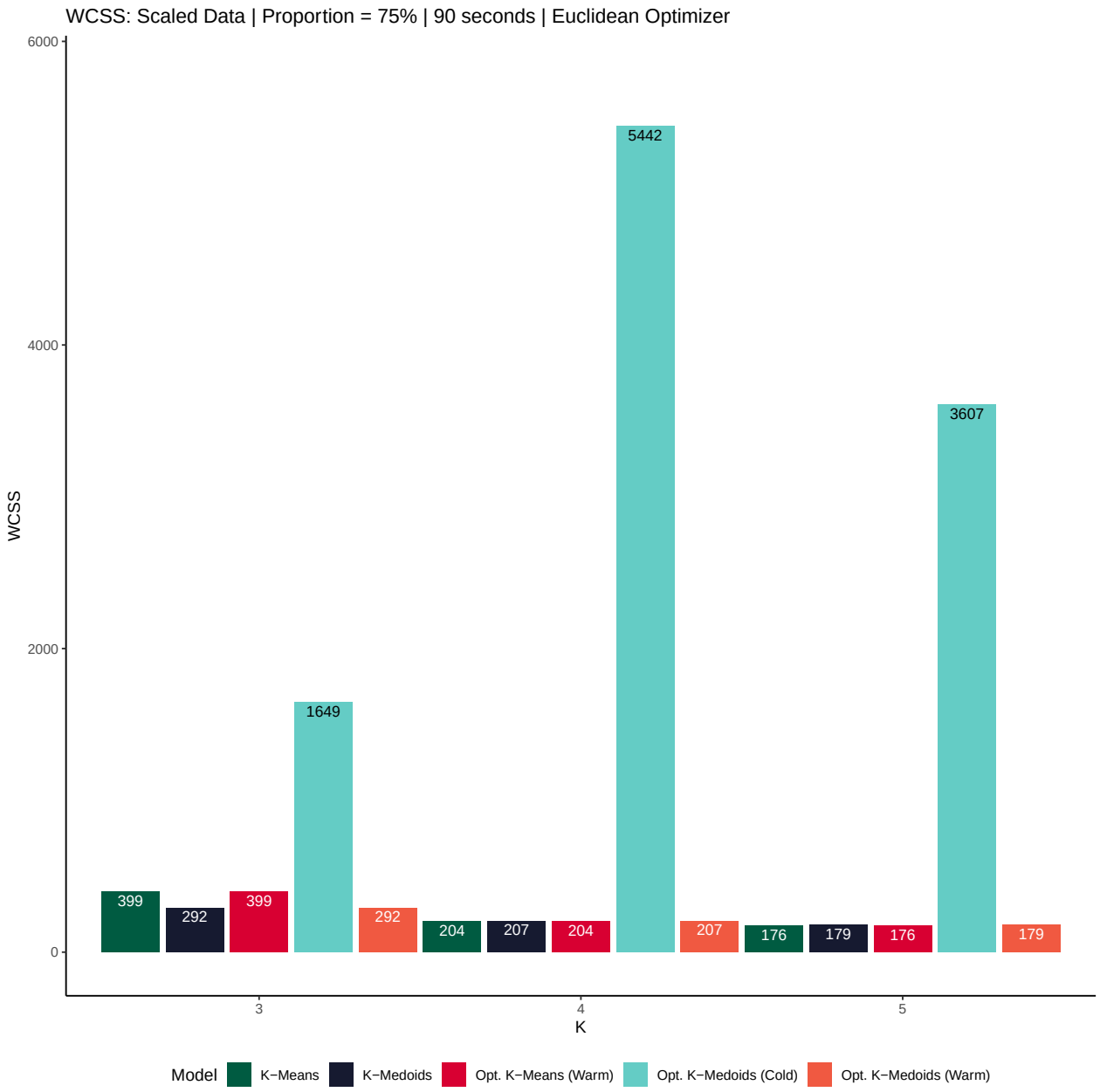

```
wcss_individual(abalone_combined, "Scaled", 0.10, "Euclidean", 90, 0, 150)
```



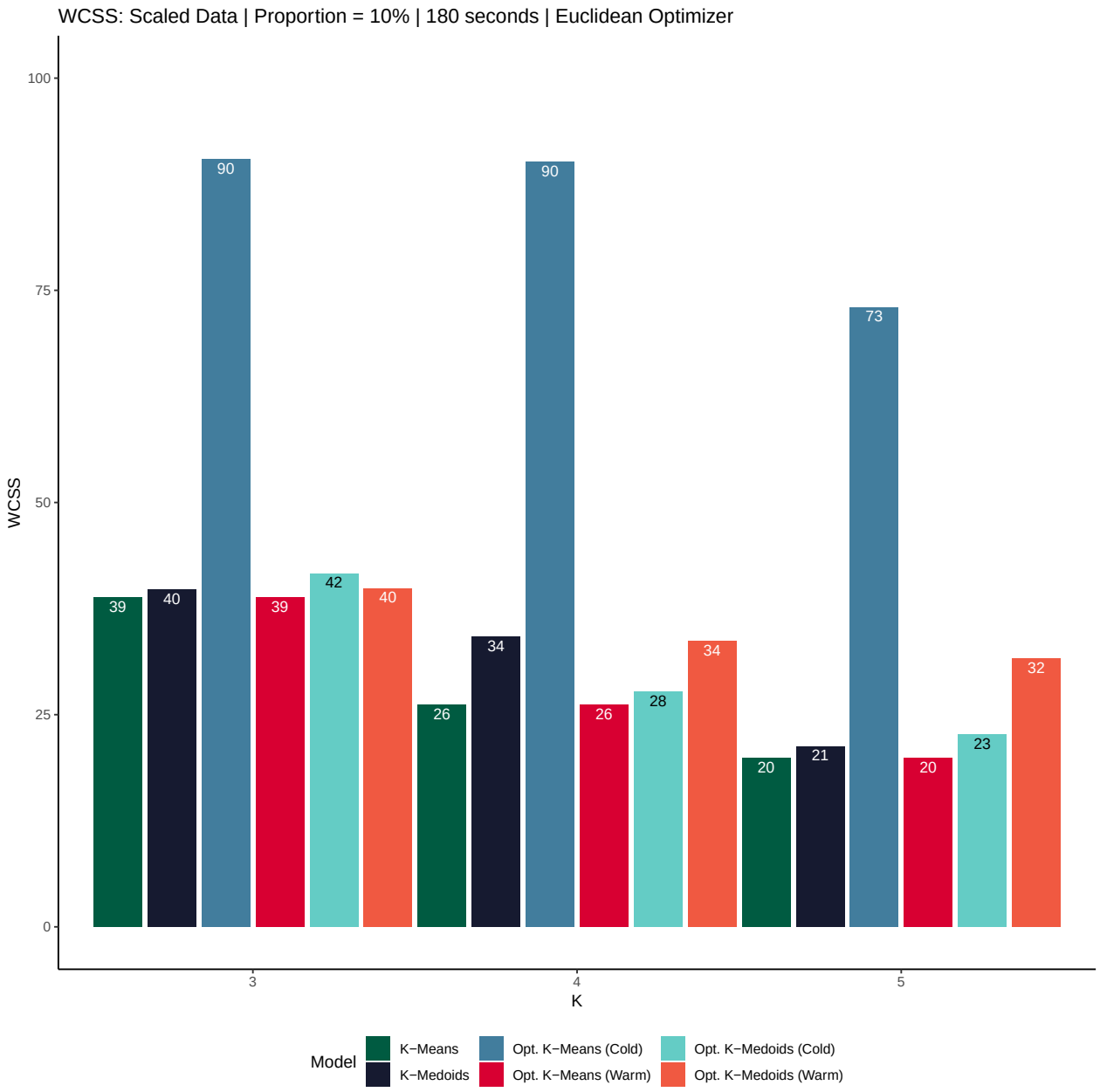

```
wcss_individual(abalone_combined, "Scaled", 0.25, "Euclidean", 90, 0, 1650)
```



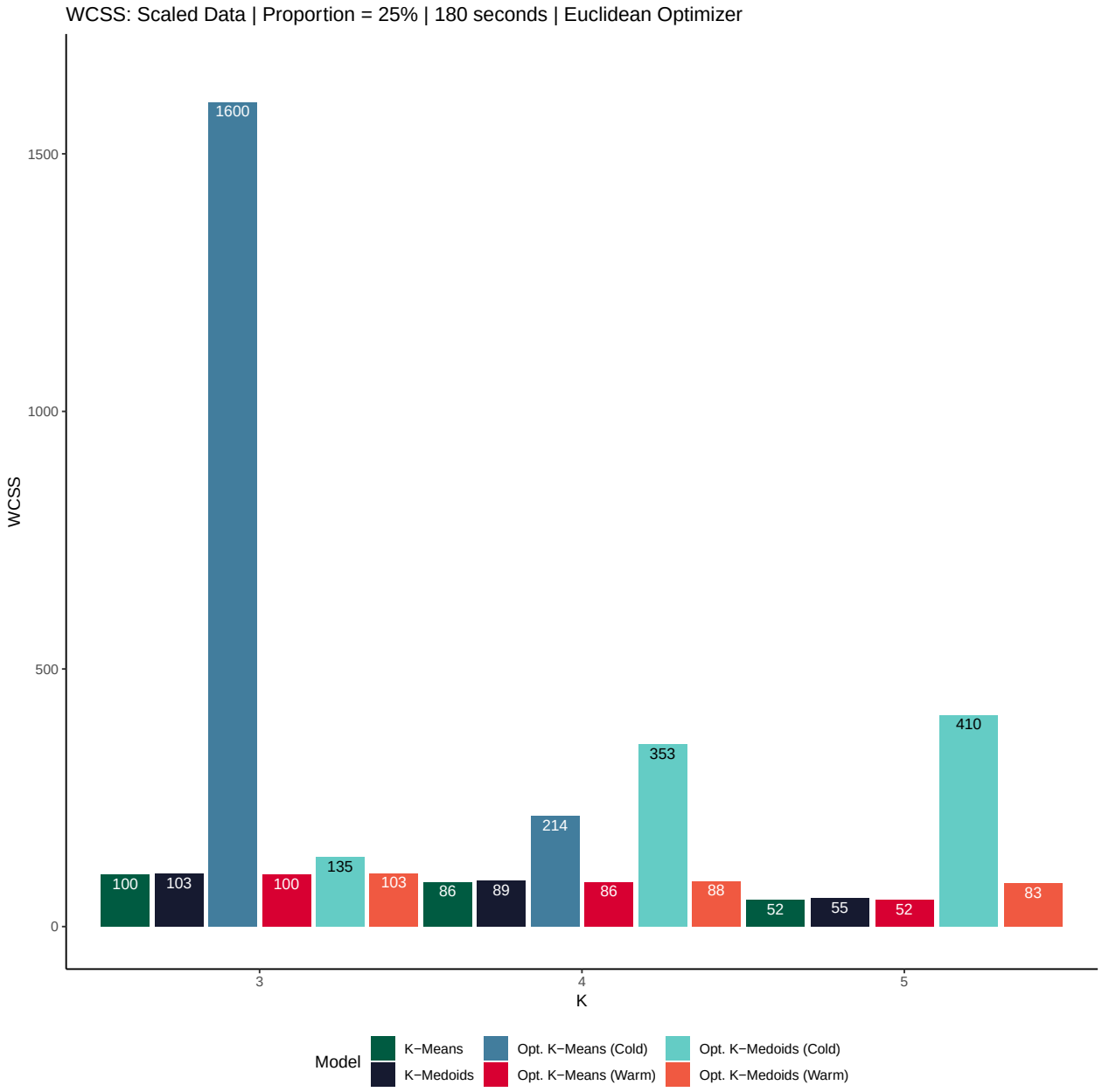

```
wcss_individual(abalone_combined, "Scaled", 0.75, "Euclidean", 90, 0, 5750)
```



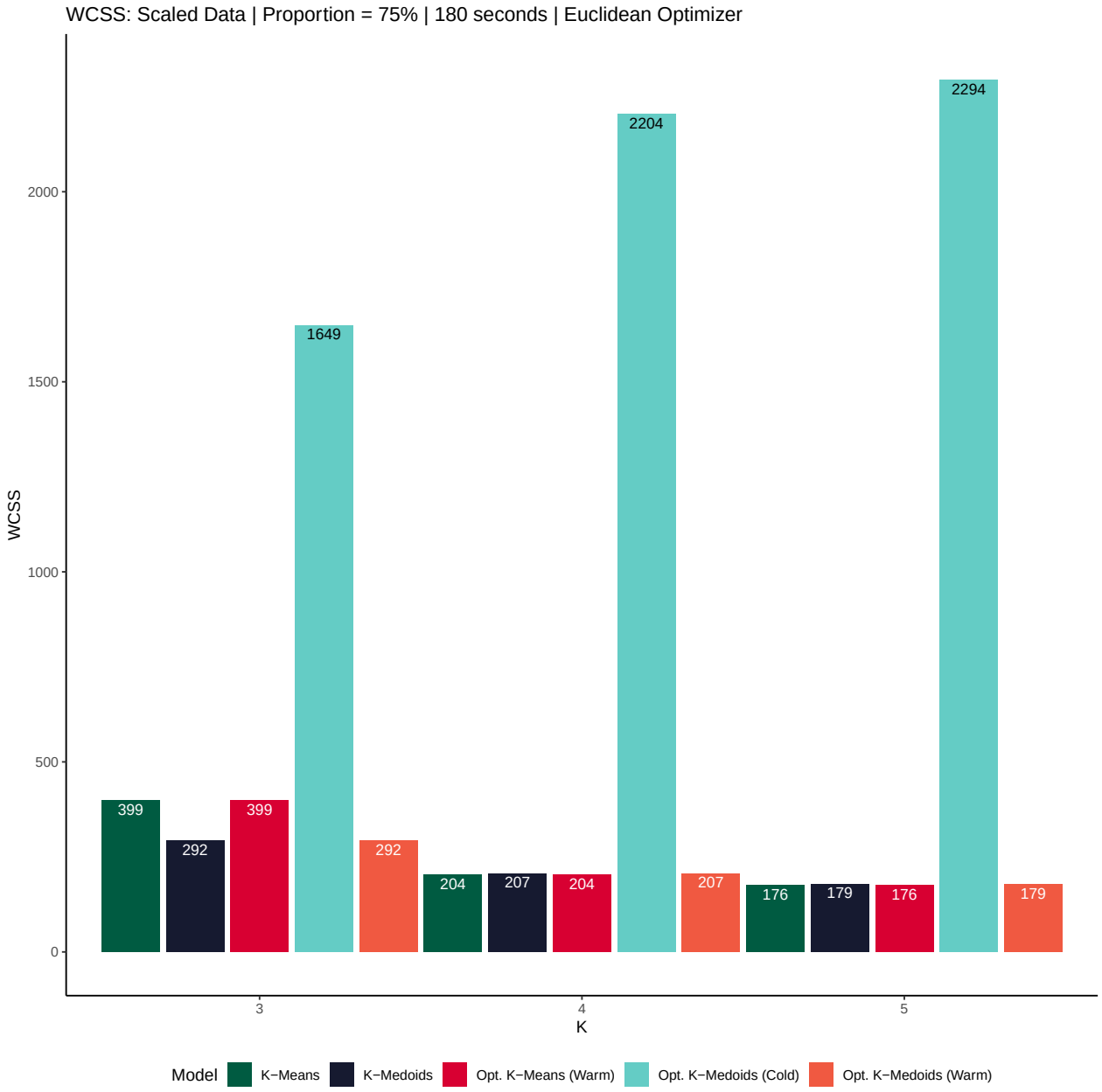

```
wcss_individual(abalone_combined, "Scaled", 0.10, "Euclidean", 180, 0, 100)
```




```
wcss_individual(abalone_combined, "Scaled", 0.25, "Euclidean", 180, 0, 1650)
```

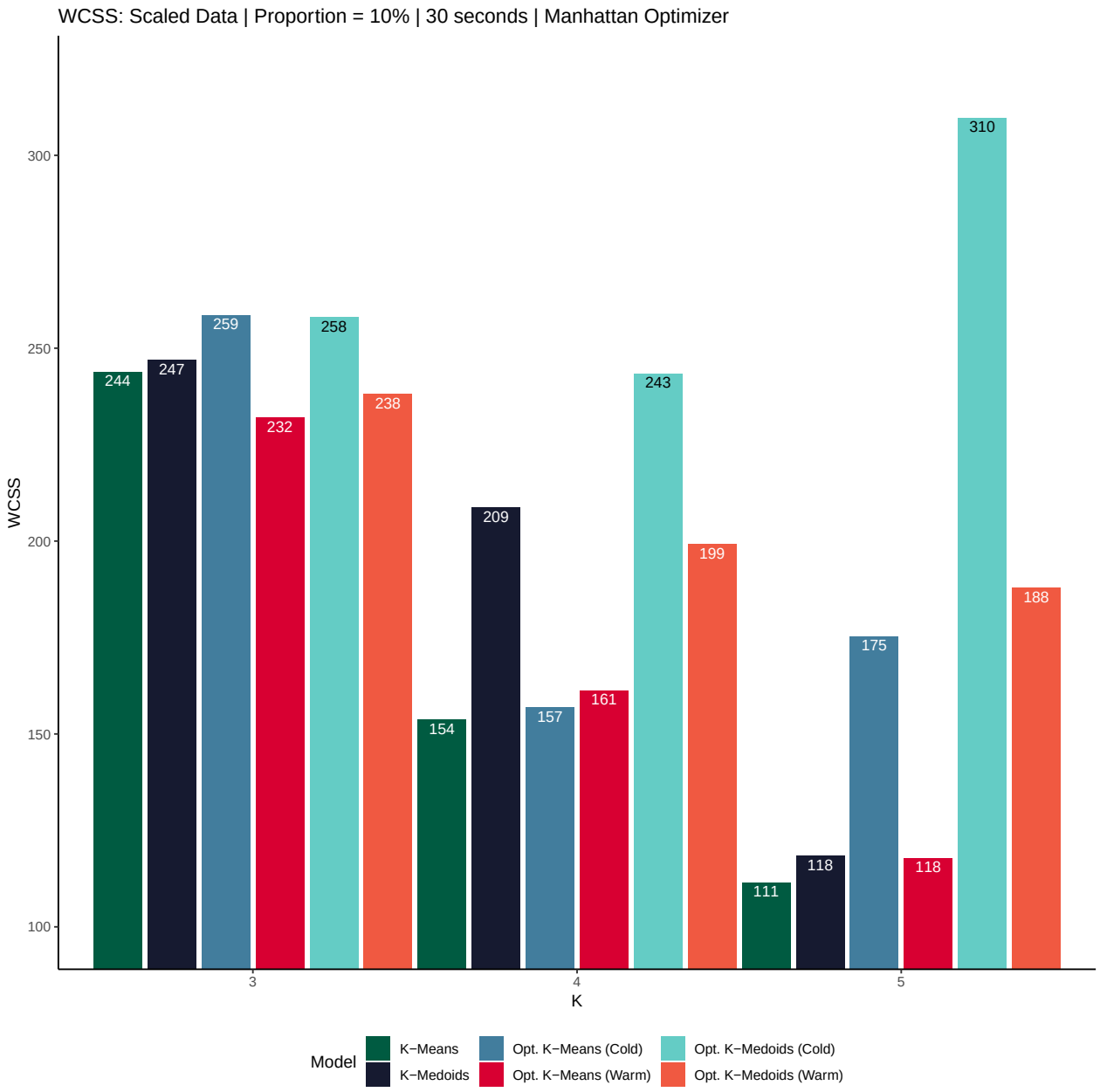



```
wcss_individual(abalone_combined, "Scaled", 0.75, "Euclidean", 180, 0, 2300)
```

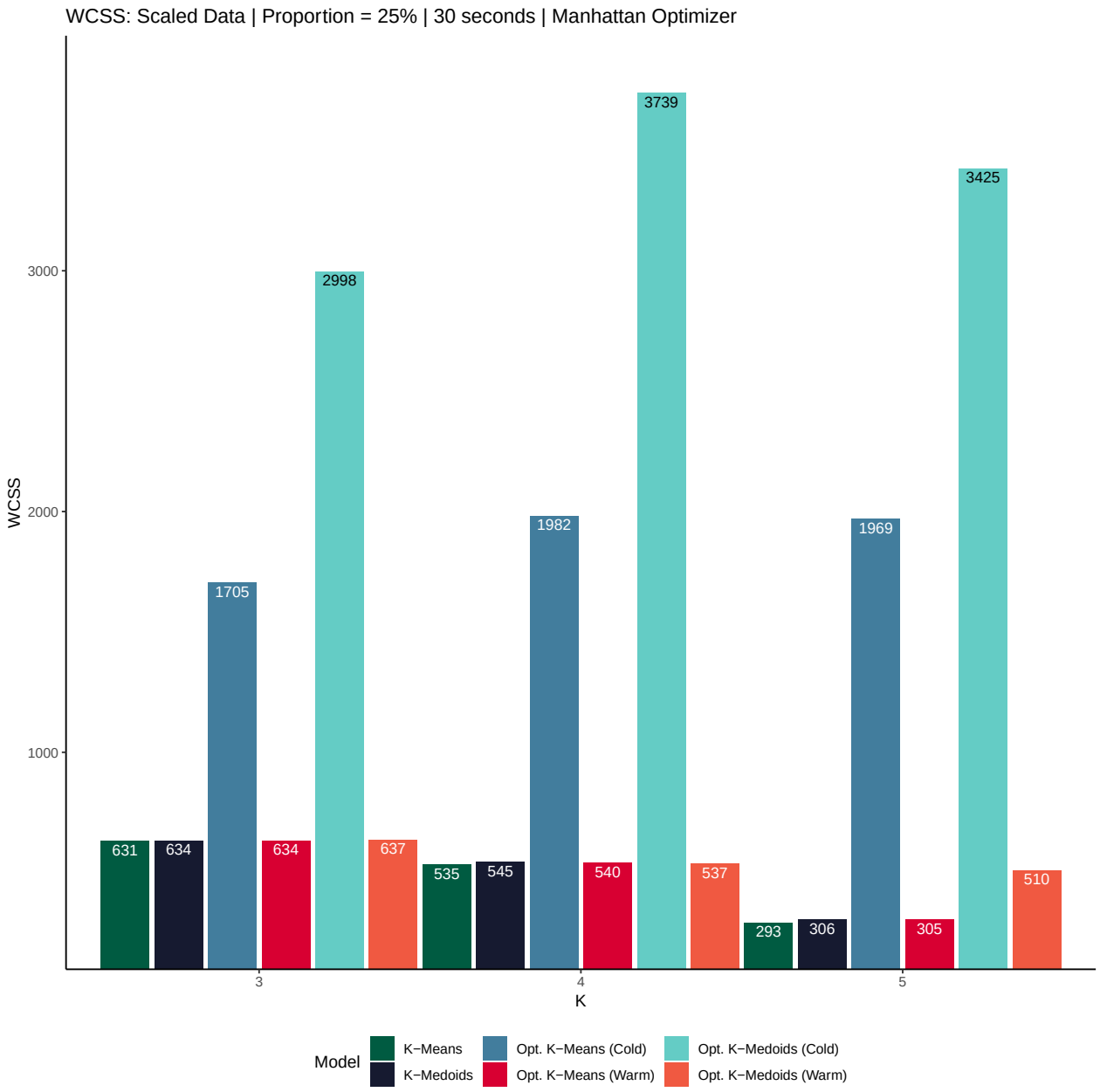


Individual Manhattan:

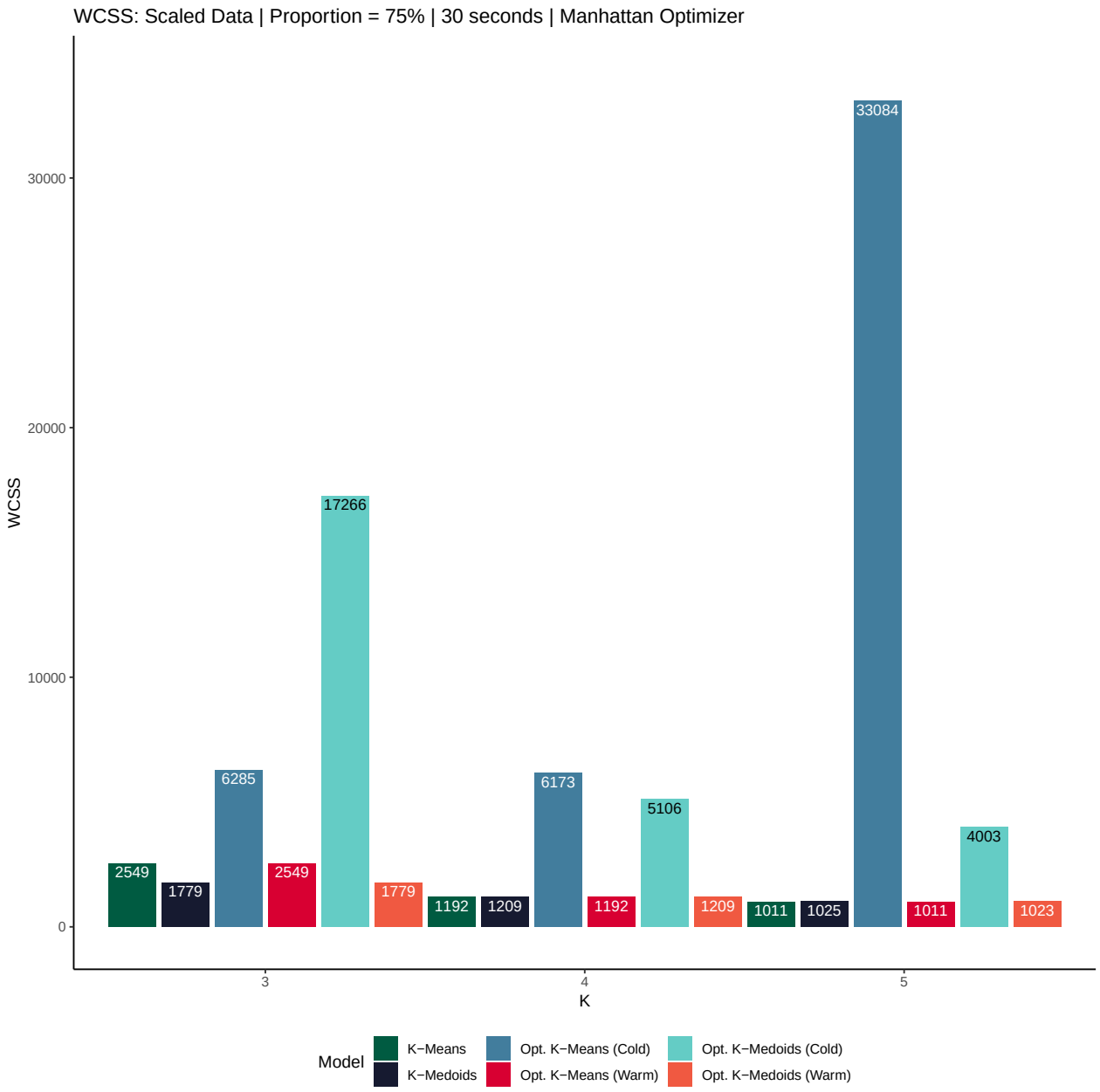
```
wcss_individual(abalone_combined, "Scaled", 0.10, "Manhattan", 30, 100, 320)
```



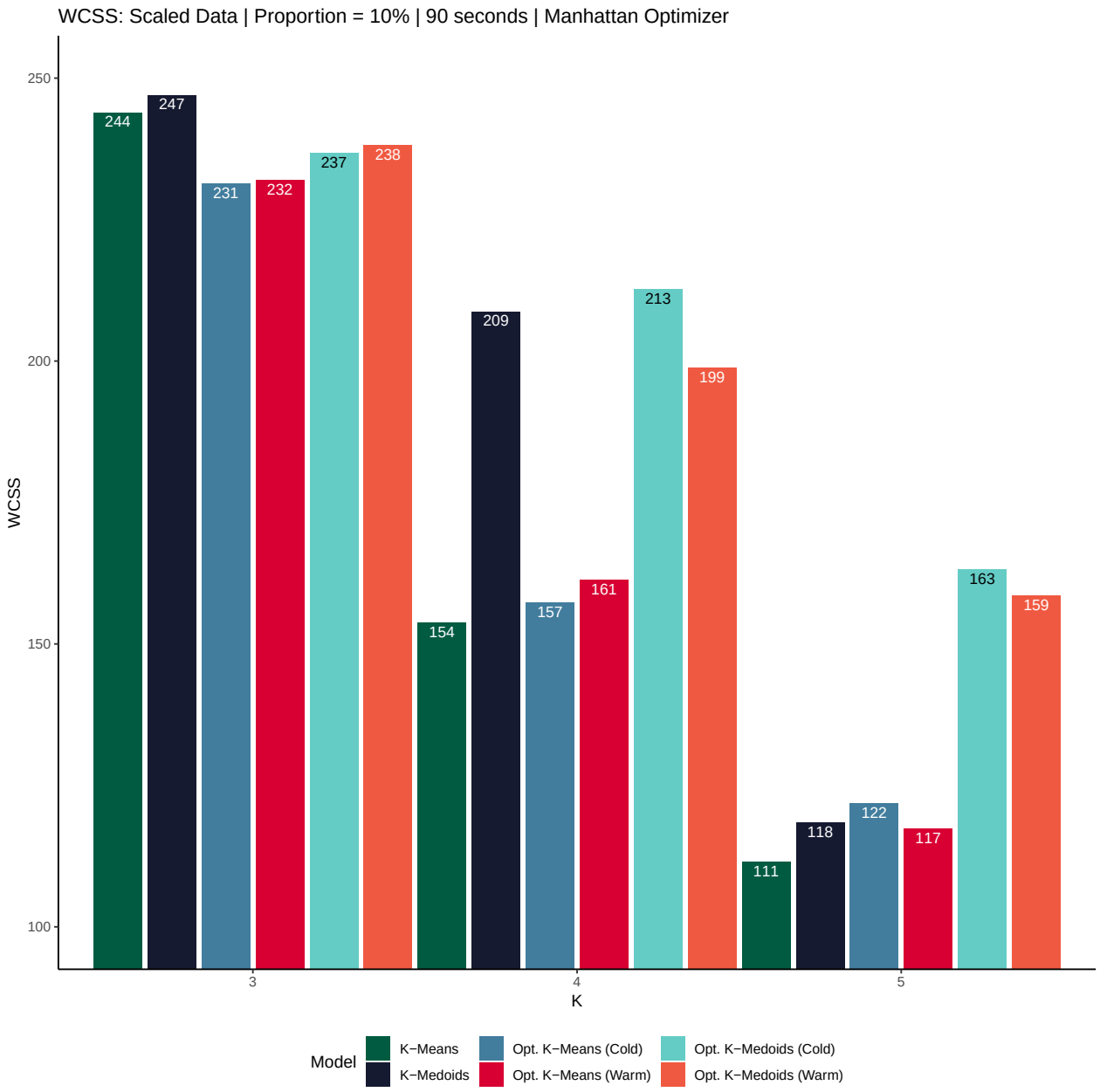

```
wcss_individual(abalone_combined, "Scaled", 0.25, "Manhattan", 30, 275, 3800)
```



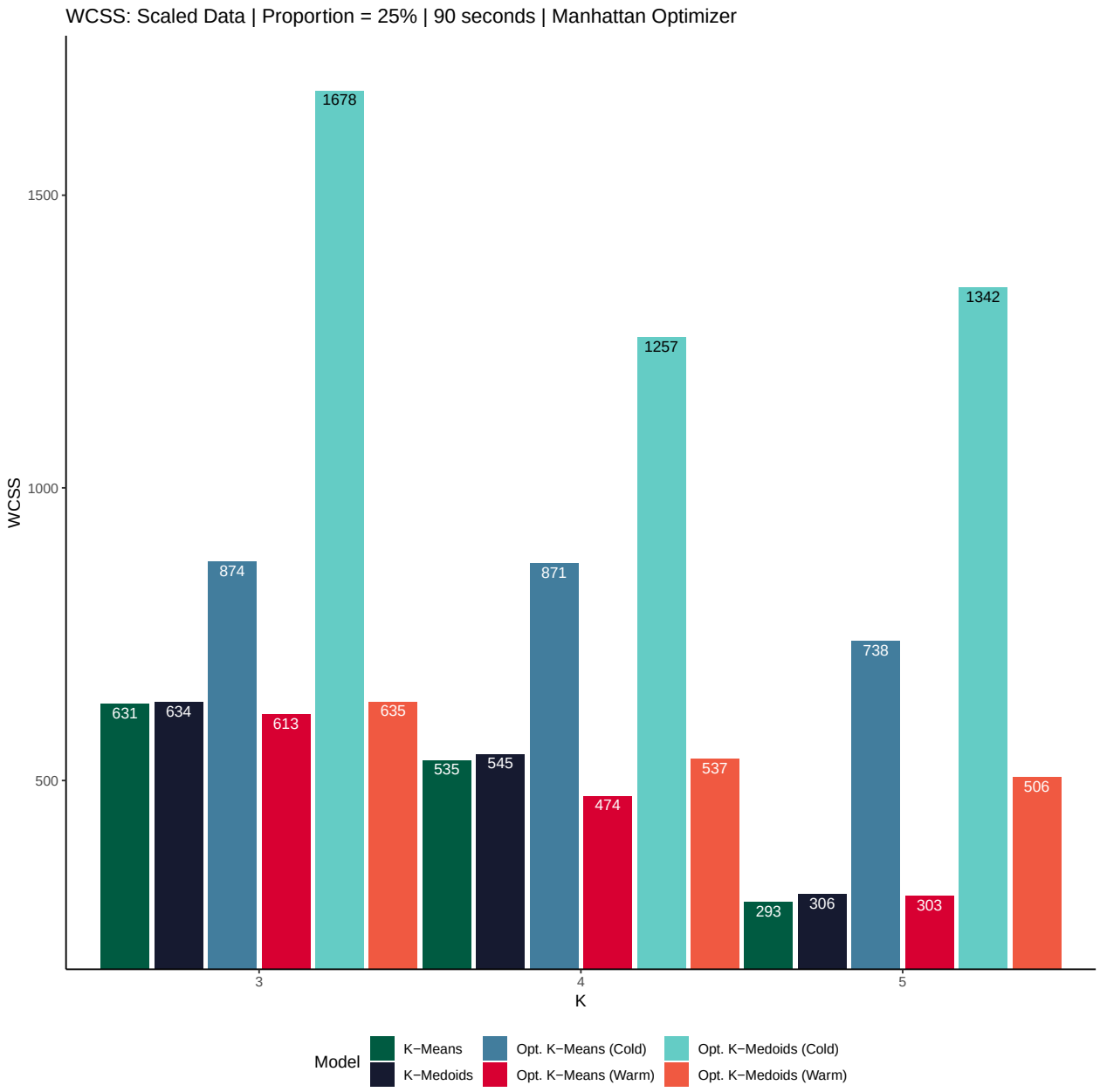

```
wcss_individual(abalone_combined, "Scaled", 0.75, "Manhattan", 30, 0, 34000)
```



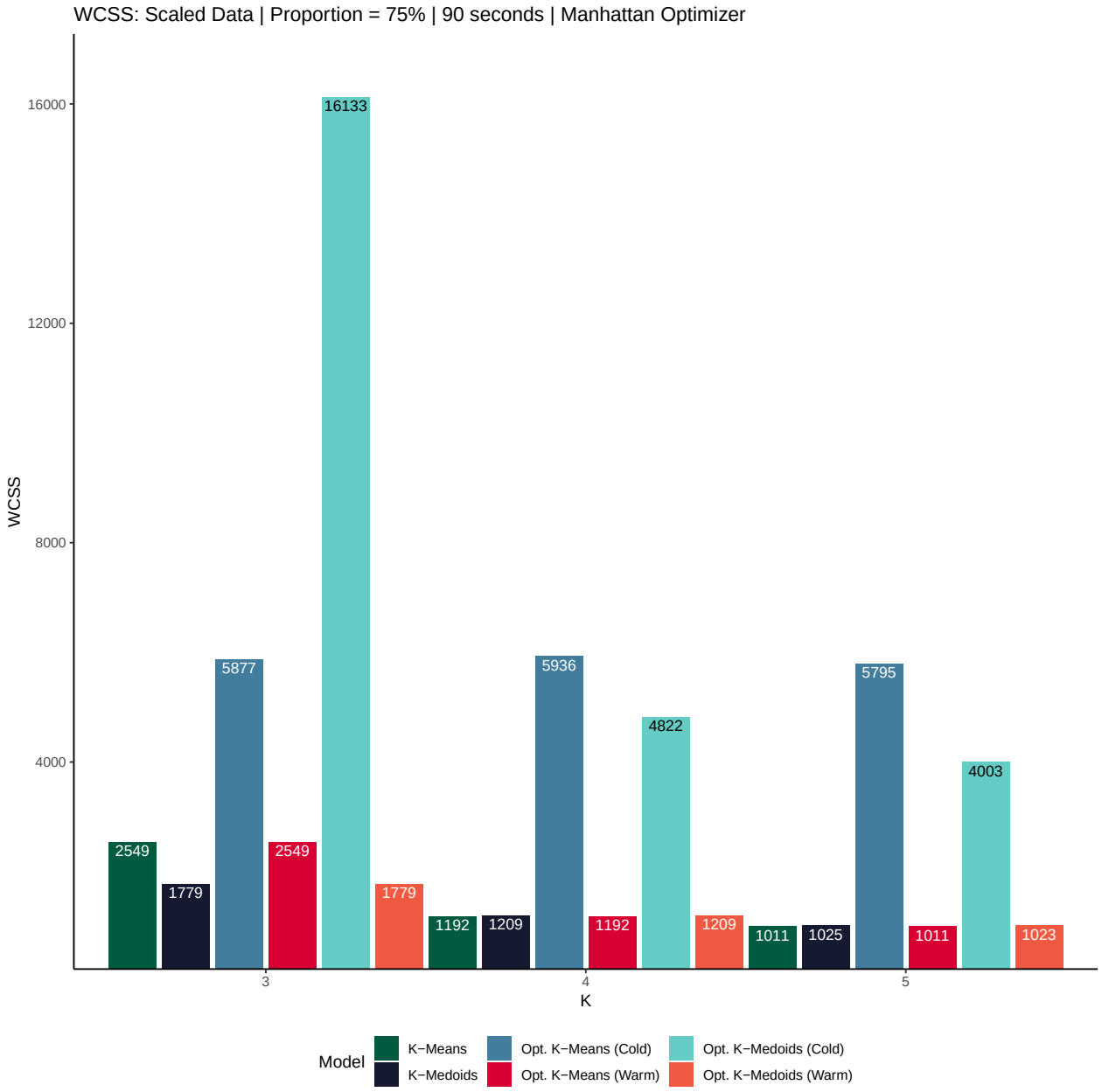

```
wcss_individual(abalone_combined, "Scaled", 0.10, "Manhattan", 90, 100, 250)
```



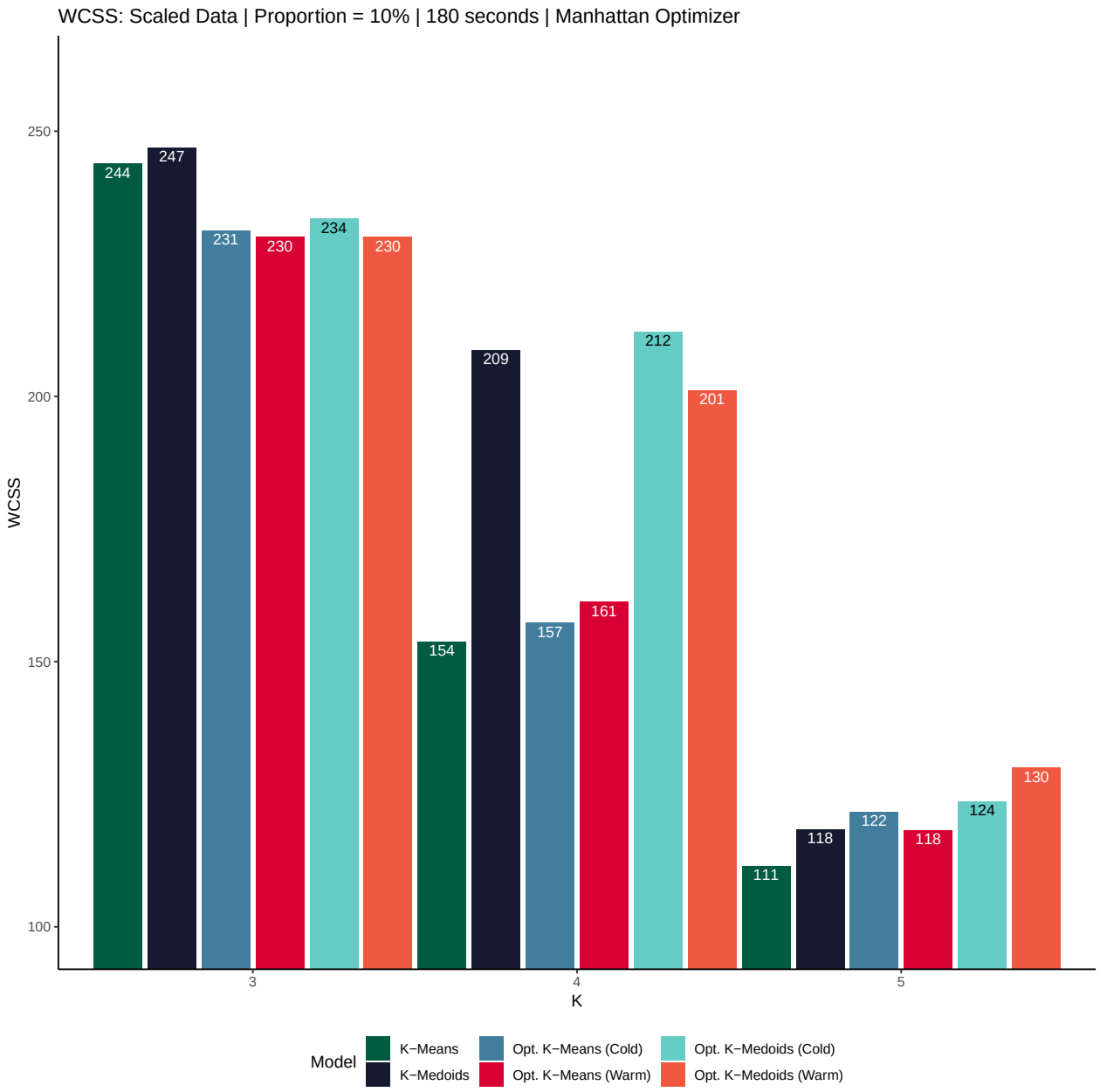

```
wcss_individual(abalone_combined, "Scaled", 0.25, "Manhattan", 90, 250, 1700)
```



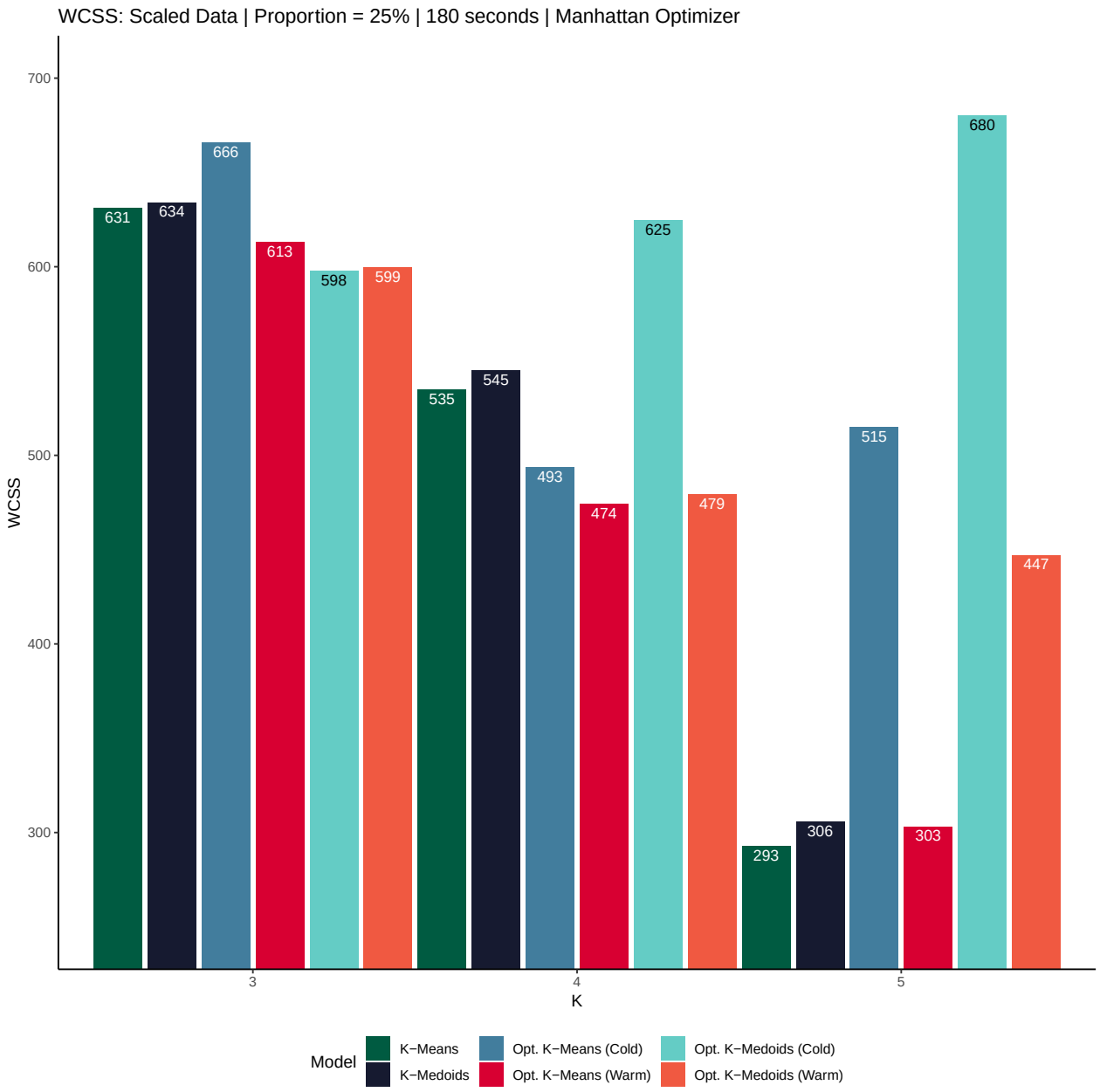

```
wcss_individual(abalone_combined, "Scaled", 0.75, "Manhattan", 90, 1000, 16500)
```



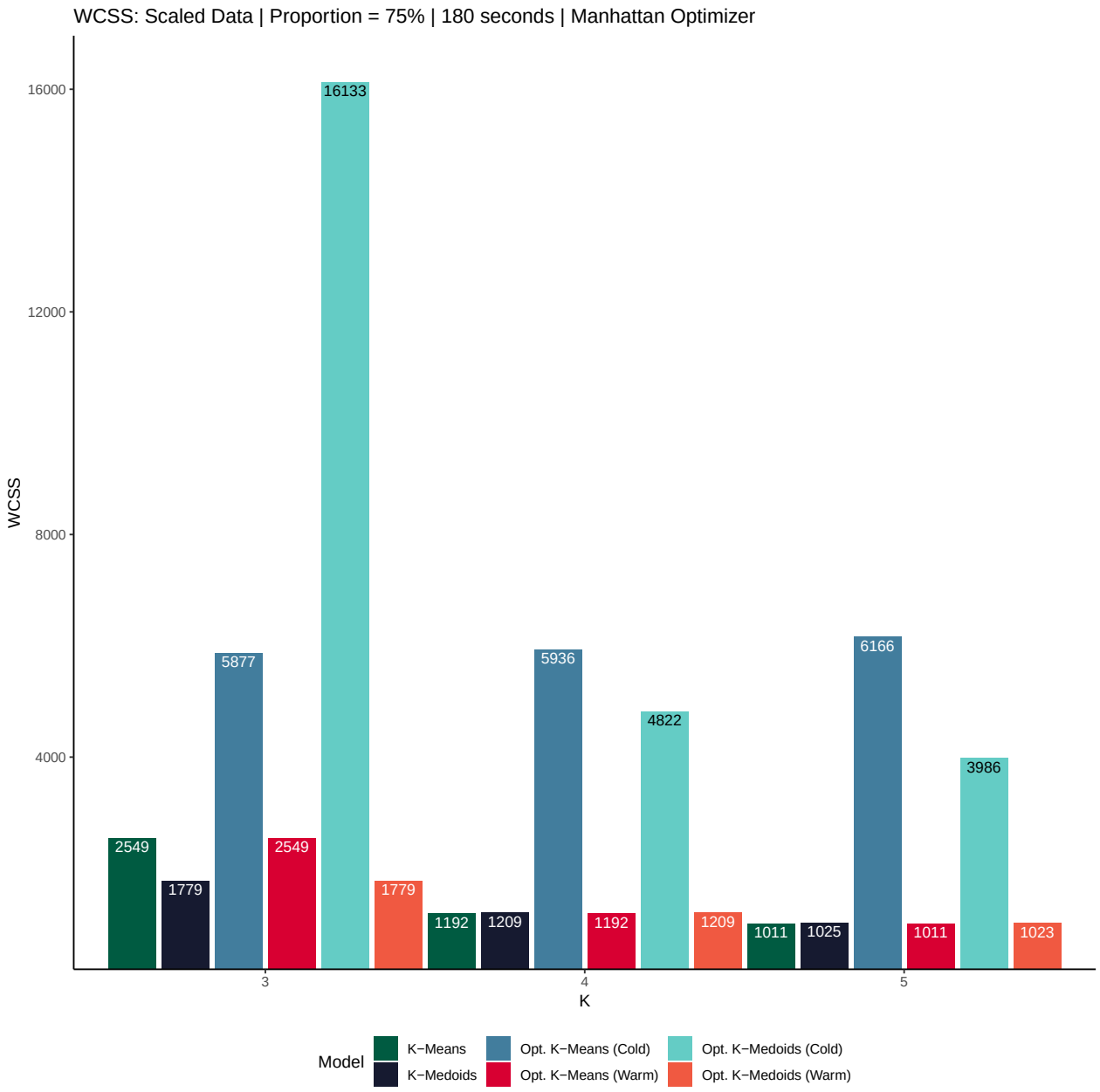

```
wcss_individual(abalone_combined, "Scaled", 0.10, "Manhattan", 180, 100, 260)
```




```
wcss_individual(abalone_combined, "Scaled", 0.25, "Manhattan", 180, 250, 700)
```



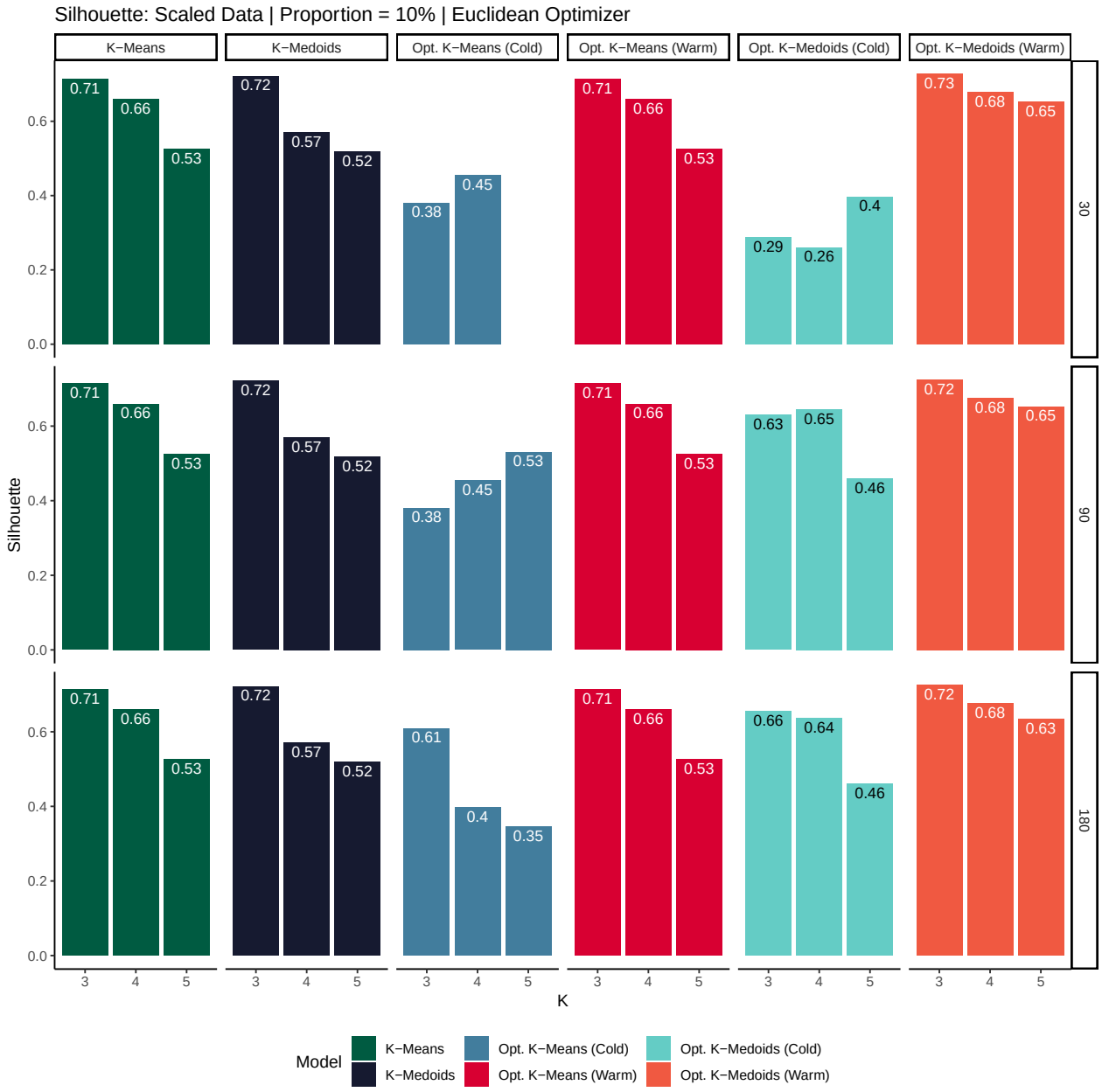

```
wcss_individual(abalone_combined, "Scaled", 0.75, "Manhattan", 180, 950, 16200)
```



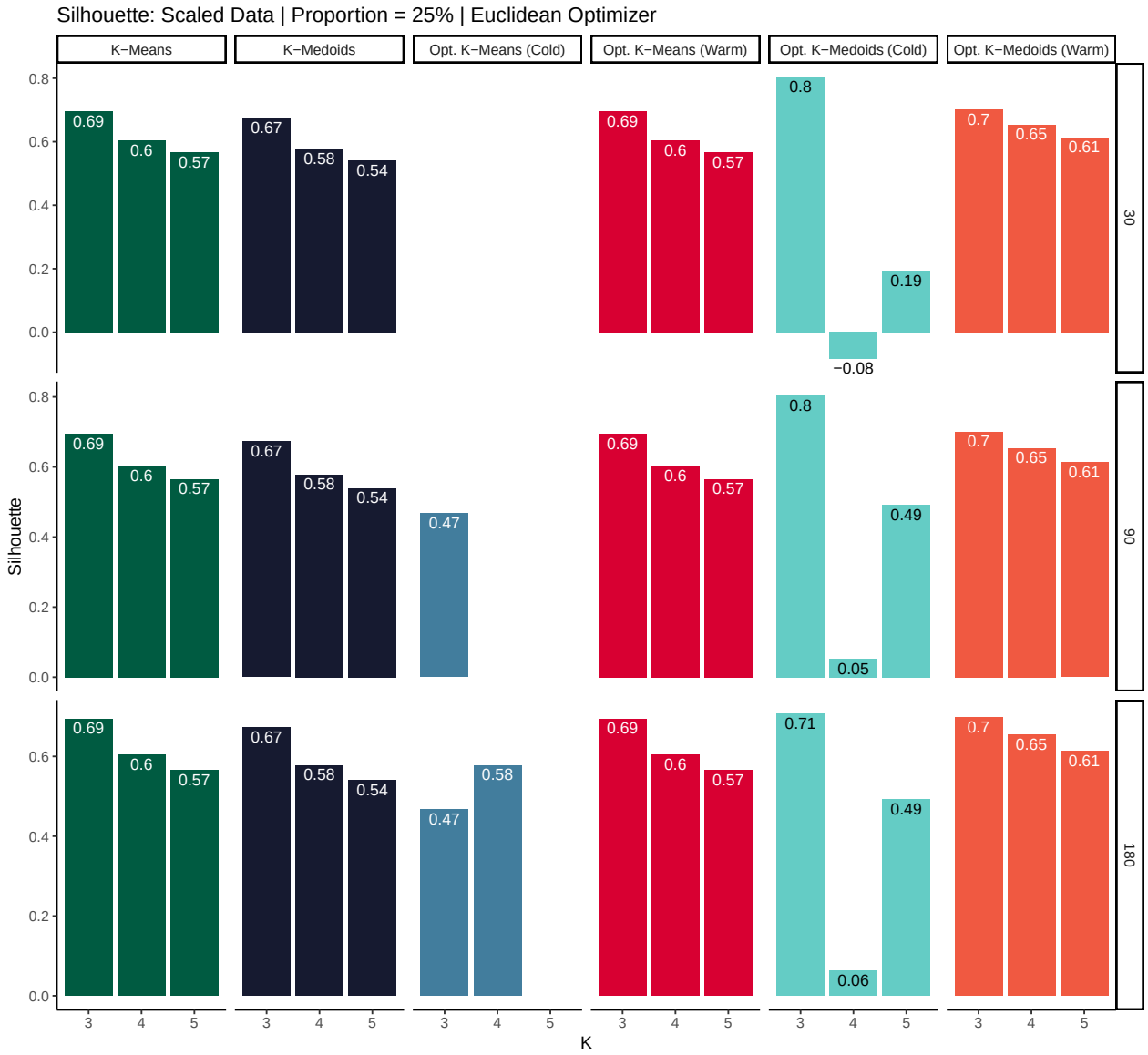
Silhouette Scaled Plots:

Euclidean:

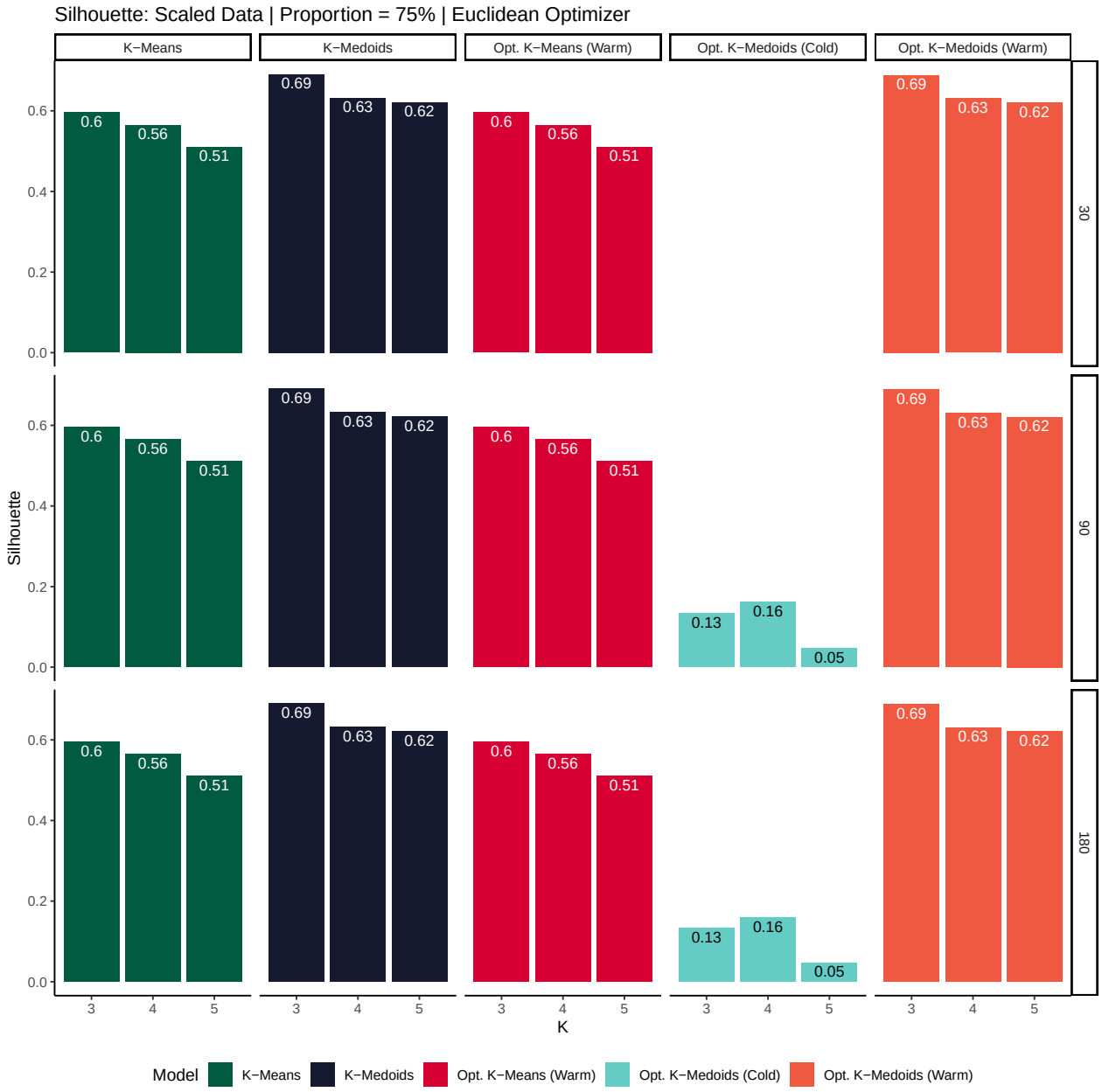
```
silhouette_grouped(abalone_combined, "Scaled", 0.10, "Euclidean", y_scale="free")
```




```
silhouette_grouped(abalone_combined, "Scaled", 0.25, "Euclidean", y_scale="free")
```

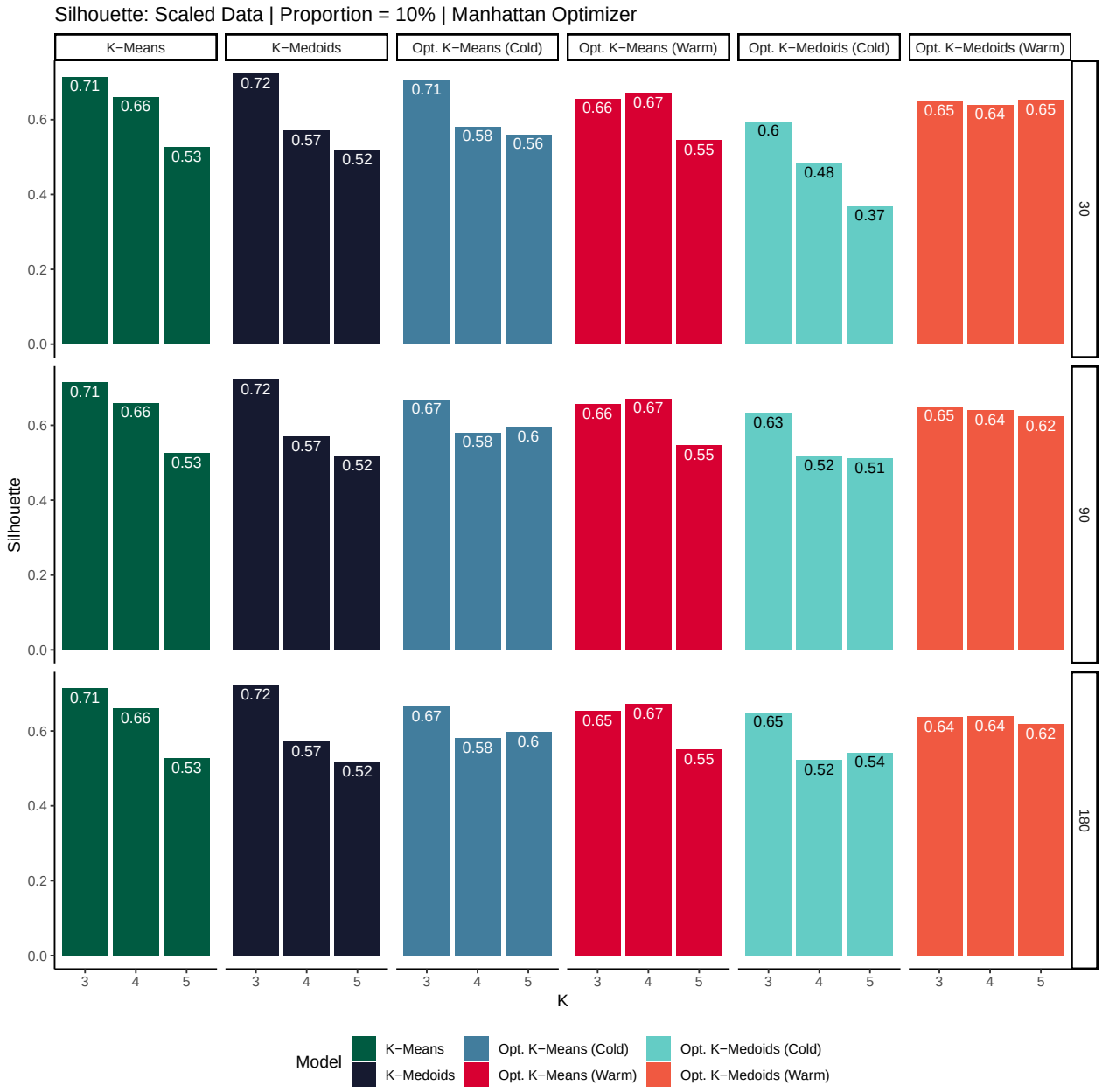



```
silhouette_grouped(abalone_combined, "Scaled", 0.75, "Euclidean", y_scale="free")
```

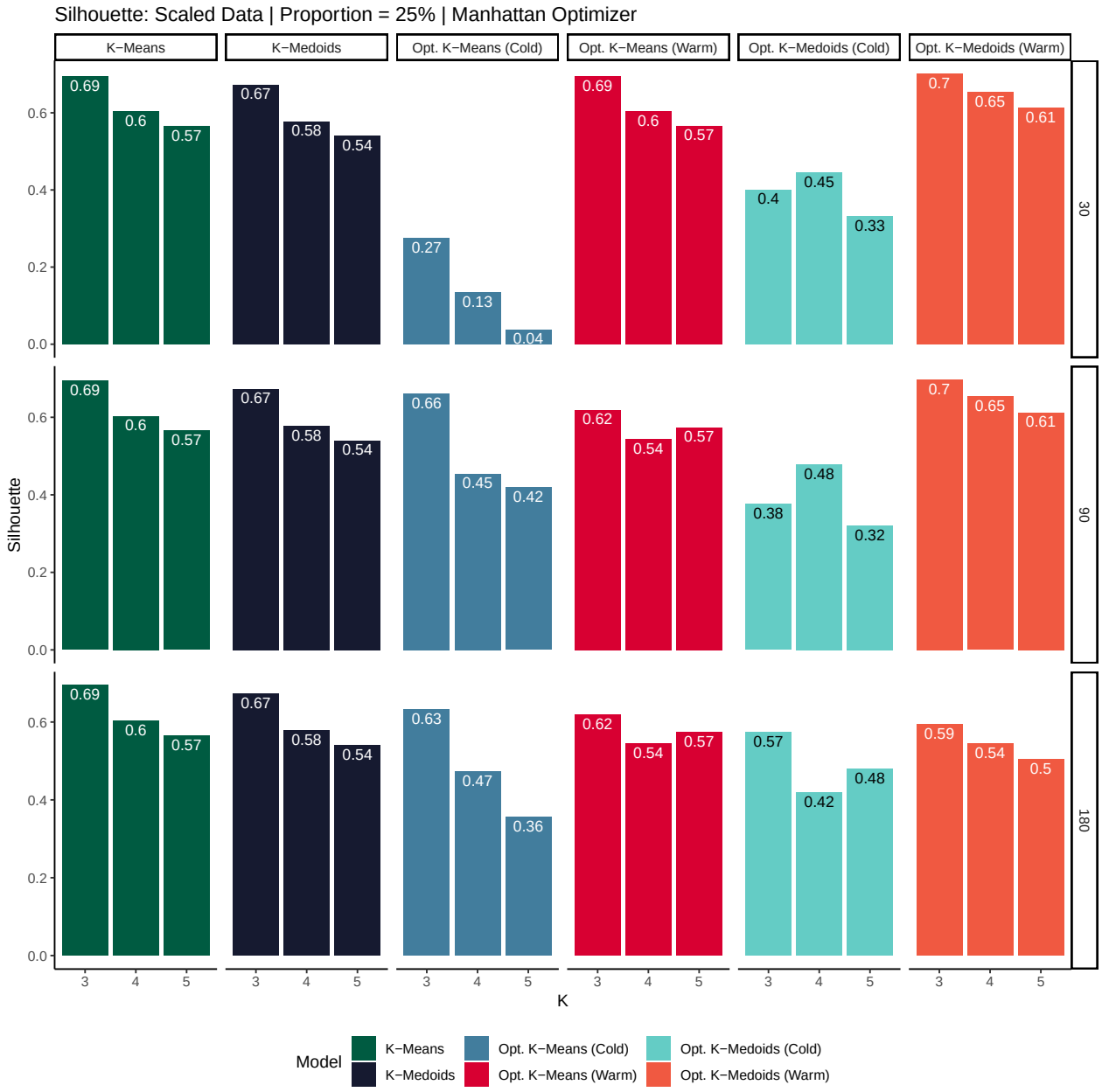


Manhattan:

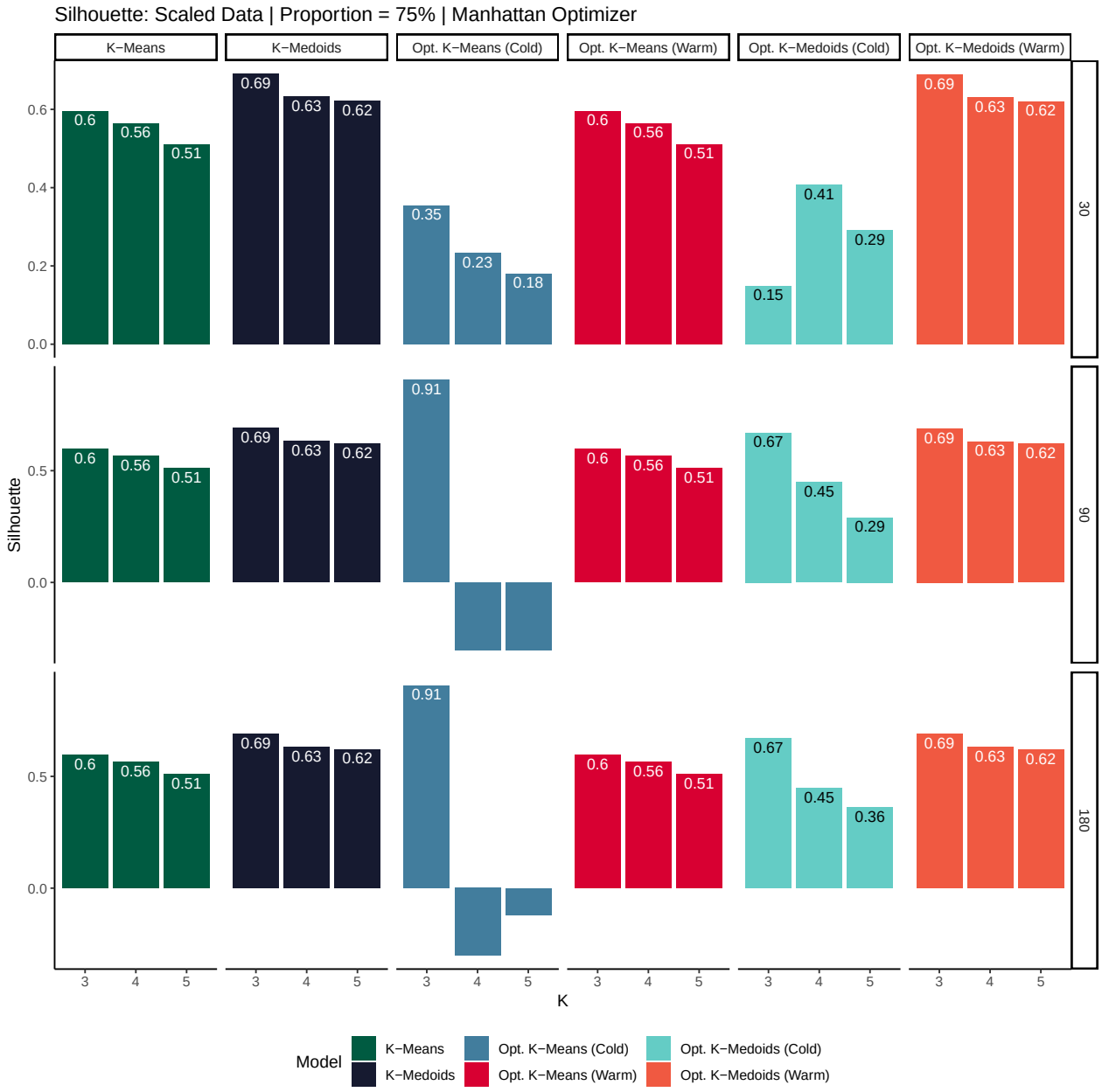
```
silhouette_grouped(abalone_combined, "Scaled", 0.10, "Manhattan", y_scale="free")
```




```
1 silhouette_grouped(abalone_combined, "Scaled", 0.25, "Manhattan", y_scale="free")
```

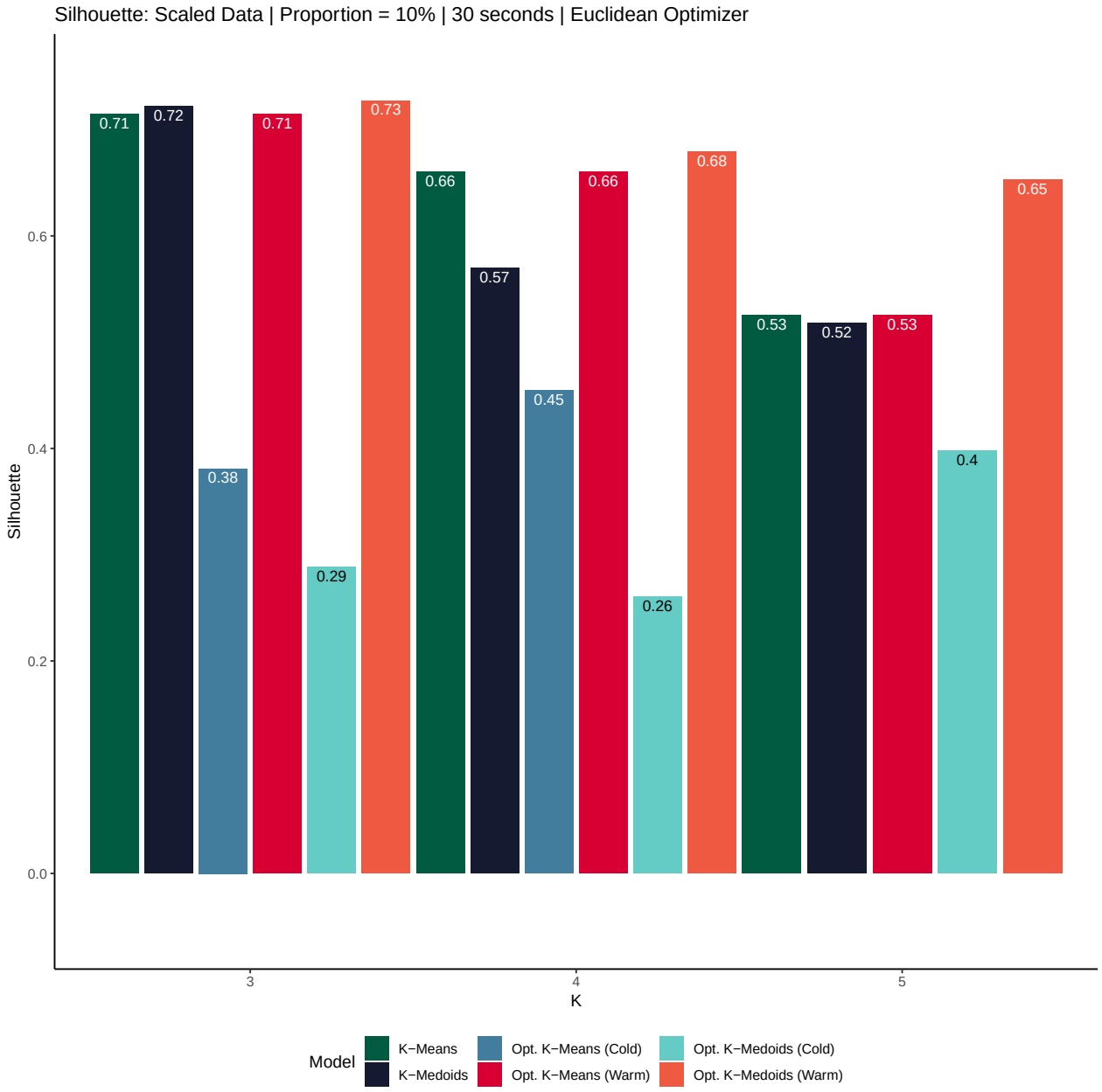



```
silhouette_grouped(abalone_combined, "Scaled", 0.75, "Manhattan", y_scale="free")
```

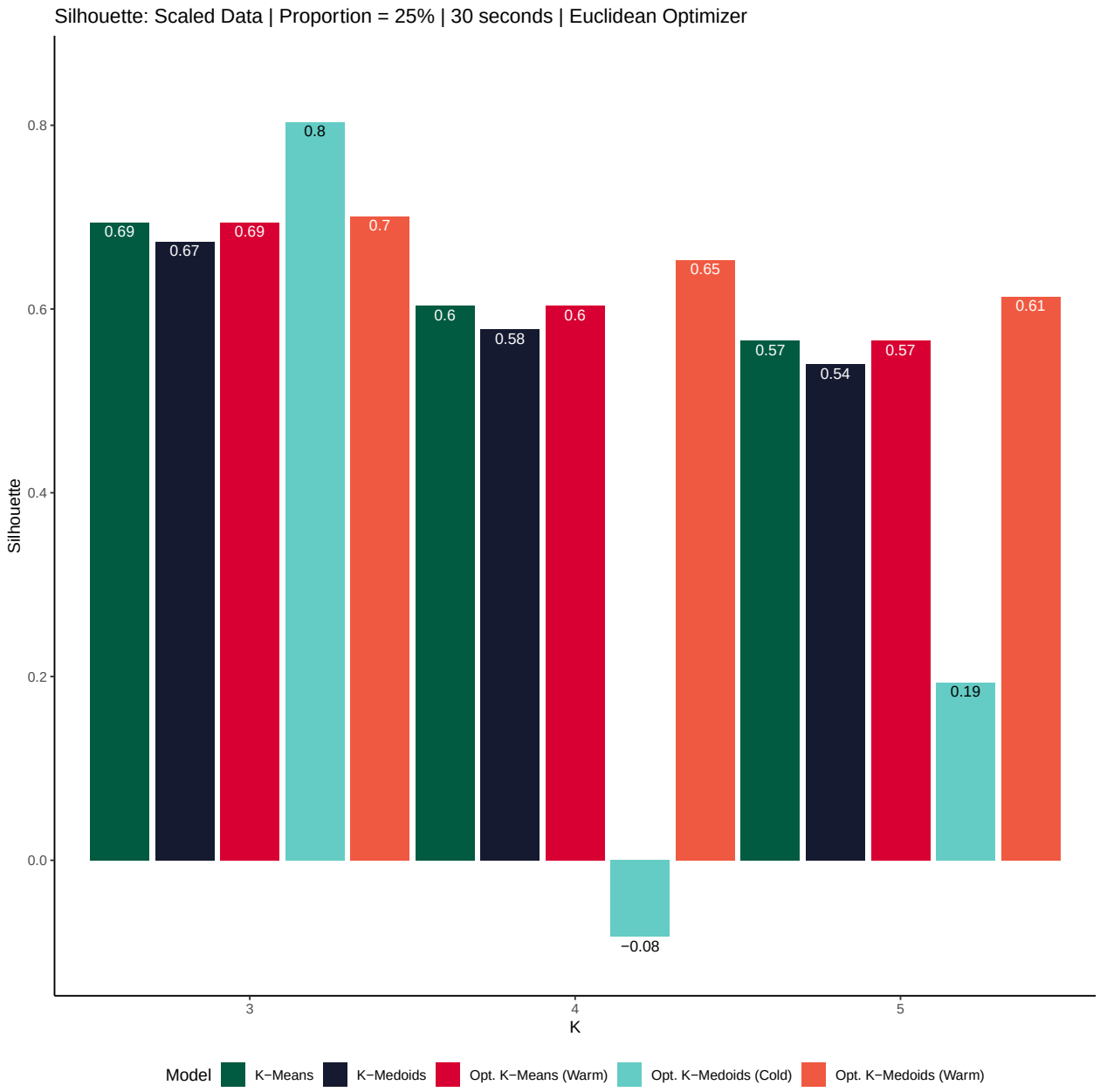


Individual Euclidean:

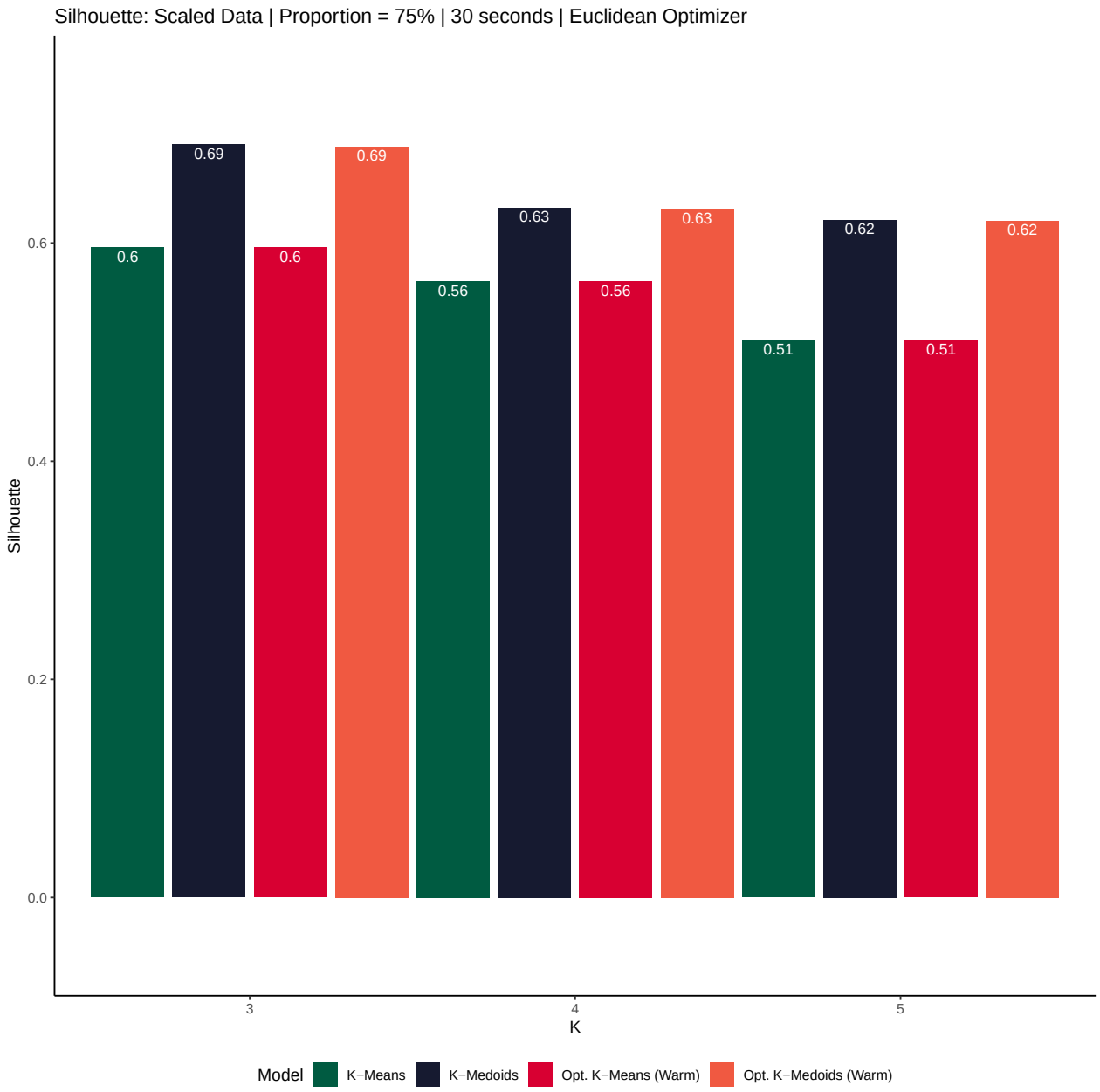
```
silhouette_individual(abalone_combined, "Scaled", 0.10, "Euclidean", 30, -0.05, 0.75)
```



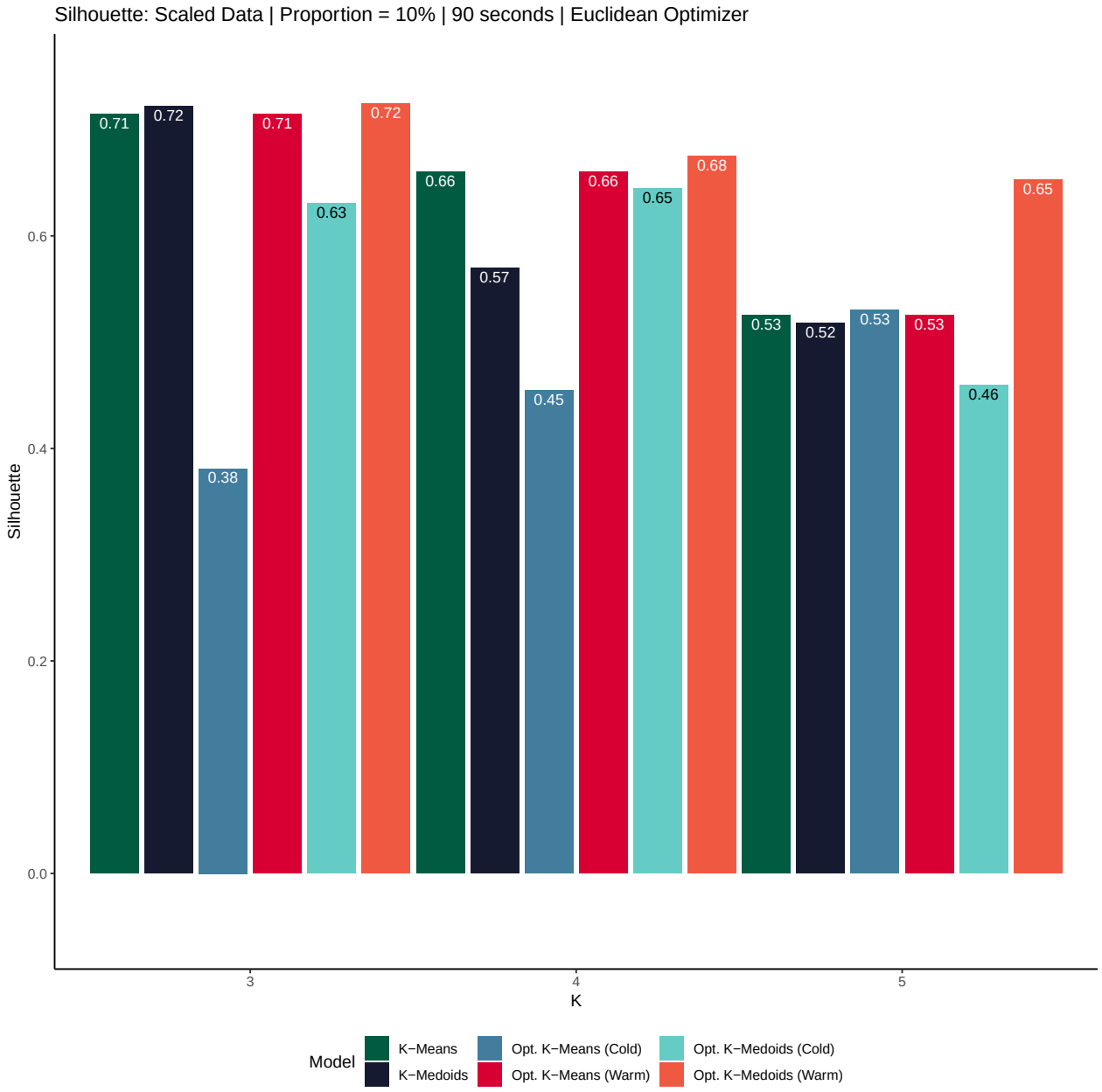

```
silhouette_individual(abalone_combined, "Scaled", 0.25, "Euclidean", 30, -0.10, 0.85)
```



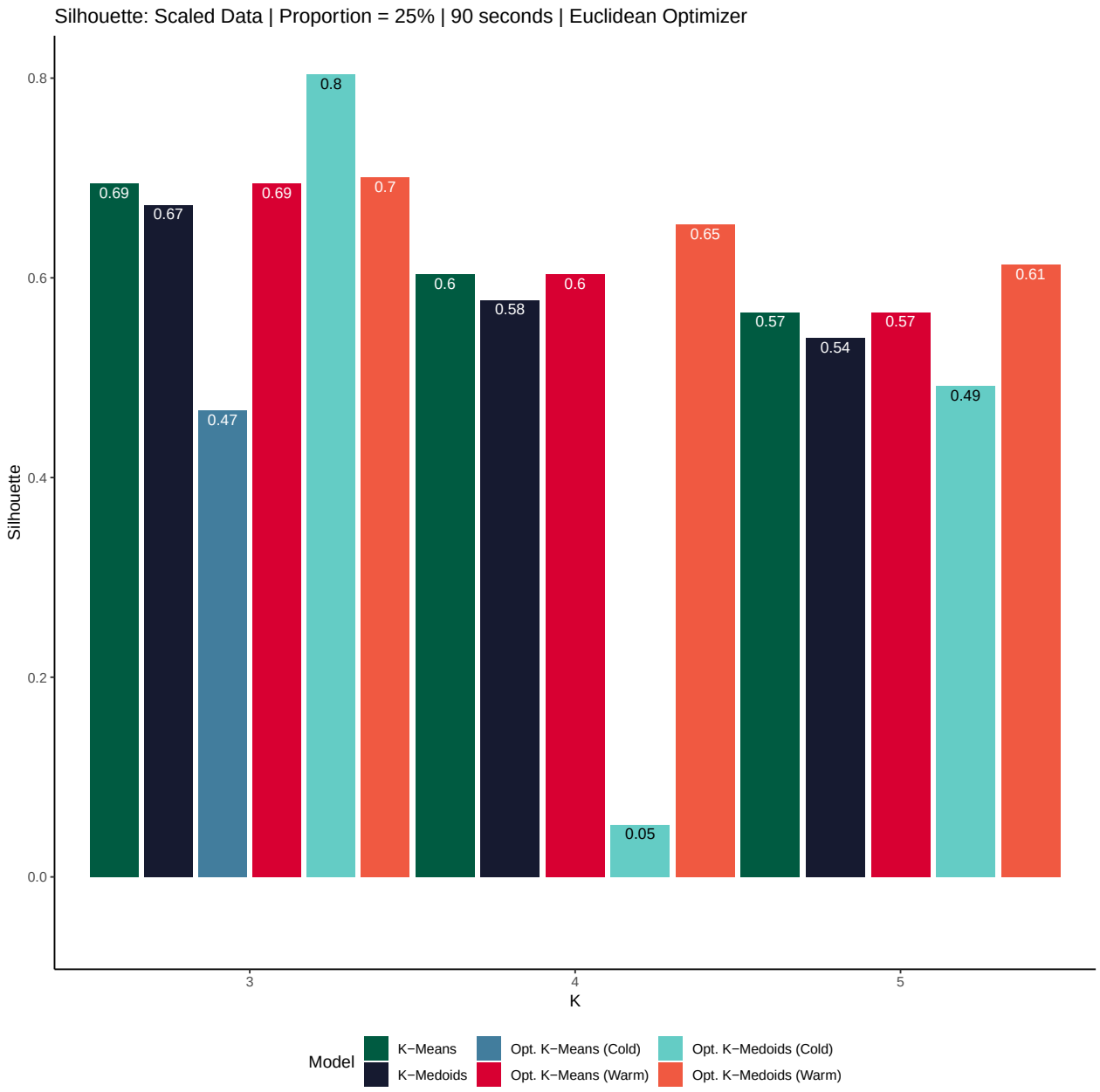

```
silhouette_individual(abalone_combined, "Scaled", 0.75, "Euclidean", 30, -0.05, 0.75)
```



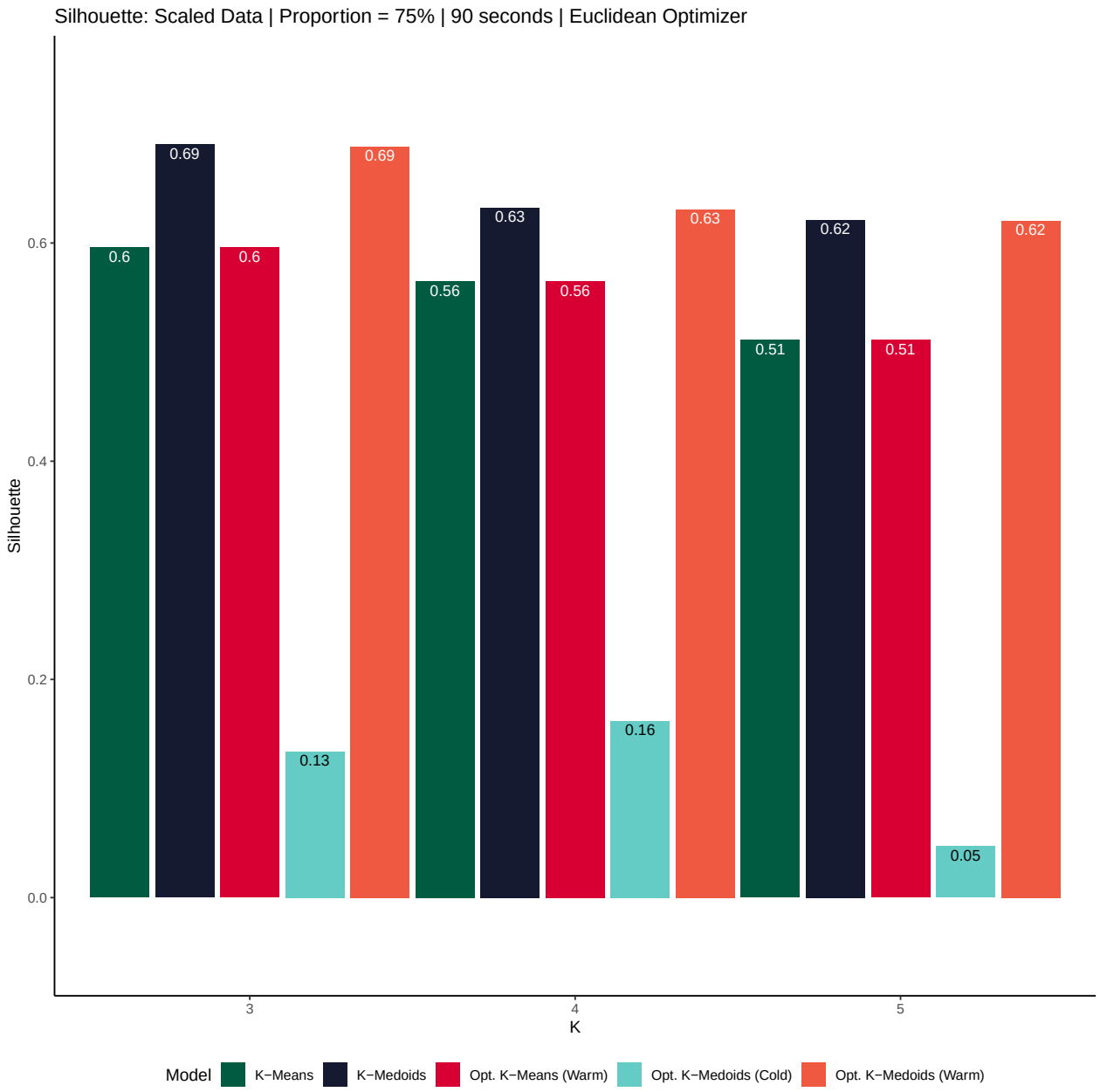

```
silhouette_individual(abalone_combined, "Scaled", 0.10, "Euclidean", 90, -0.05, 0.75)
```



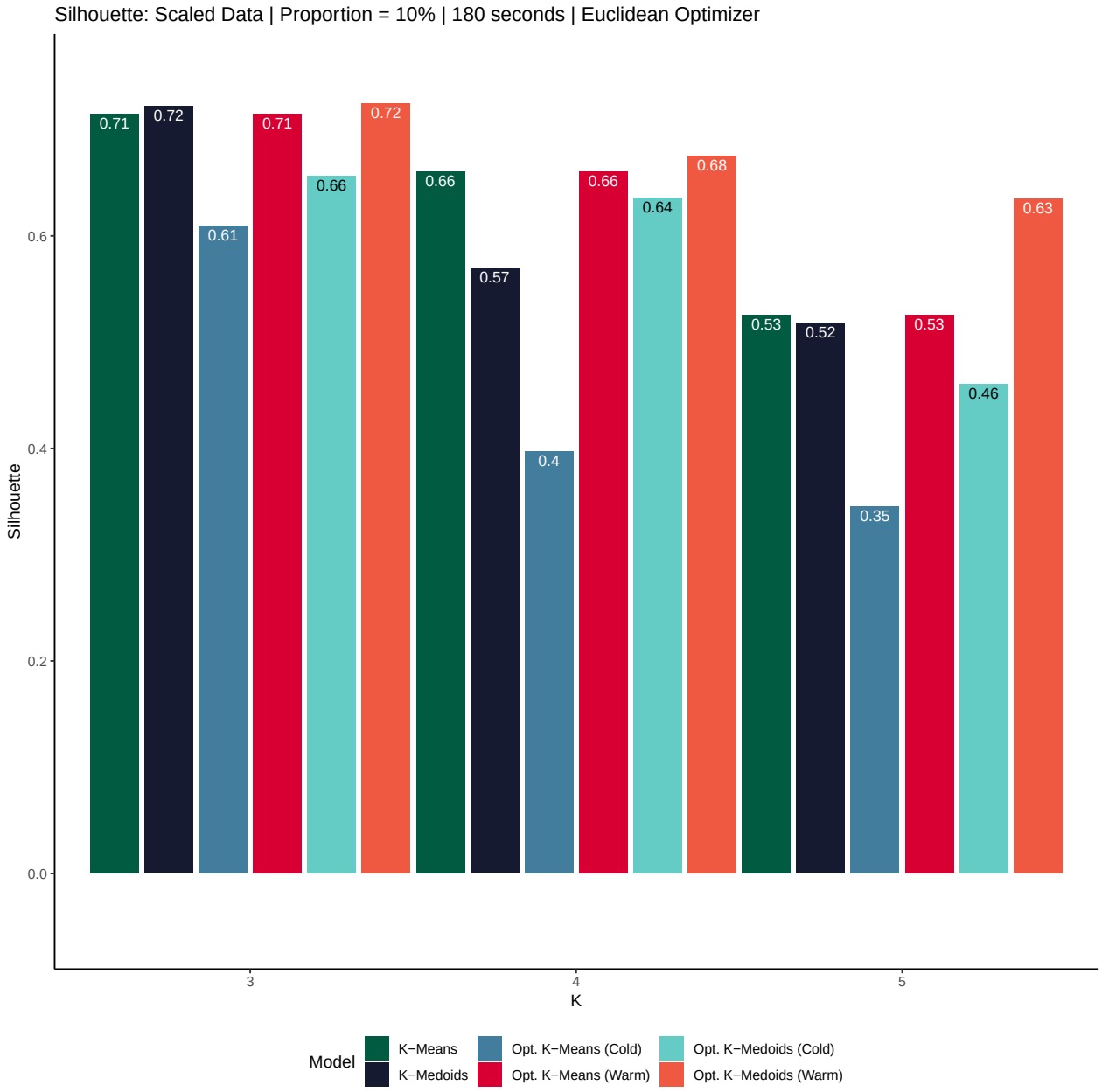

```
silhouette_individual(abalone_combined, "Scaled", 0.25, "Euclidean", 90, -0.05, 0.80)
```



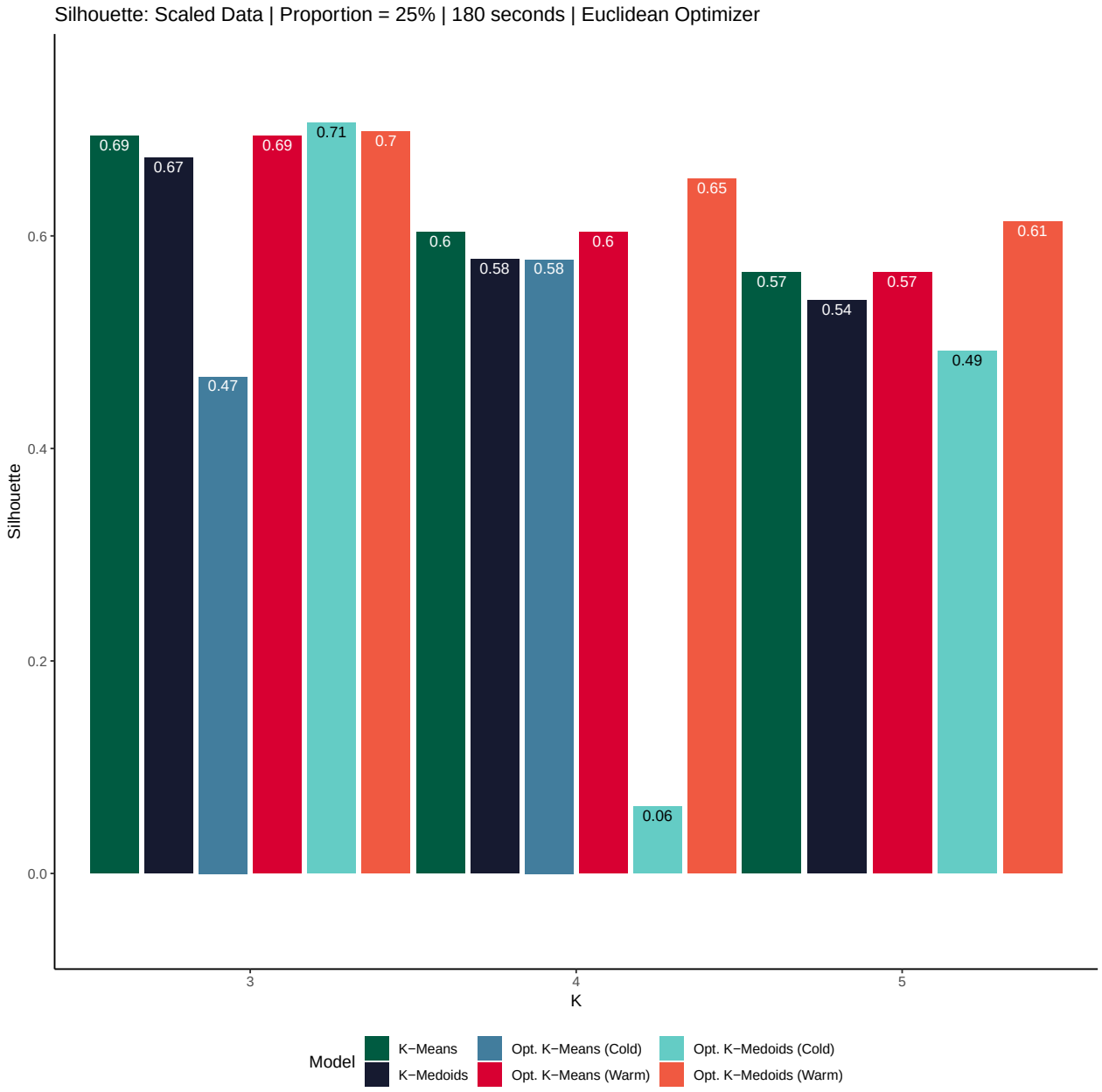

```
silhouette_individual(abalone_combined, "Scaled", 0.75, "Euclidean", 90, -0.05, 0.75)
```



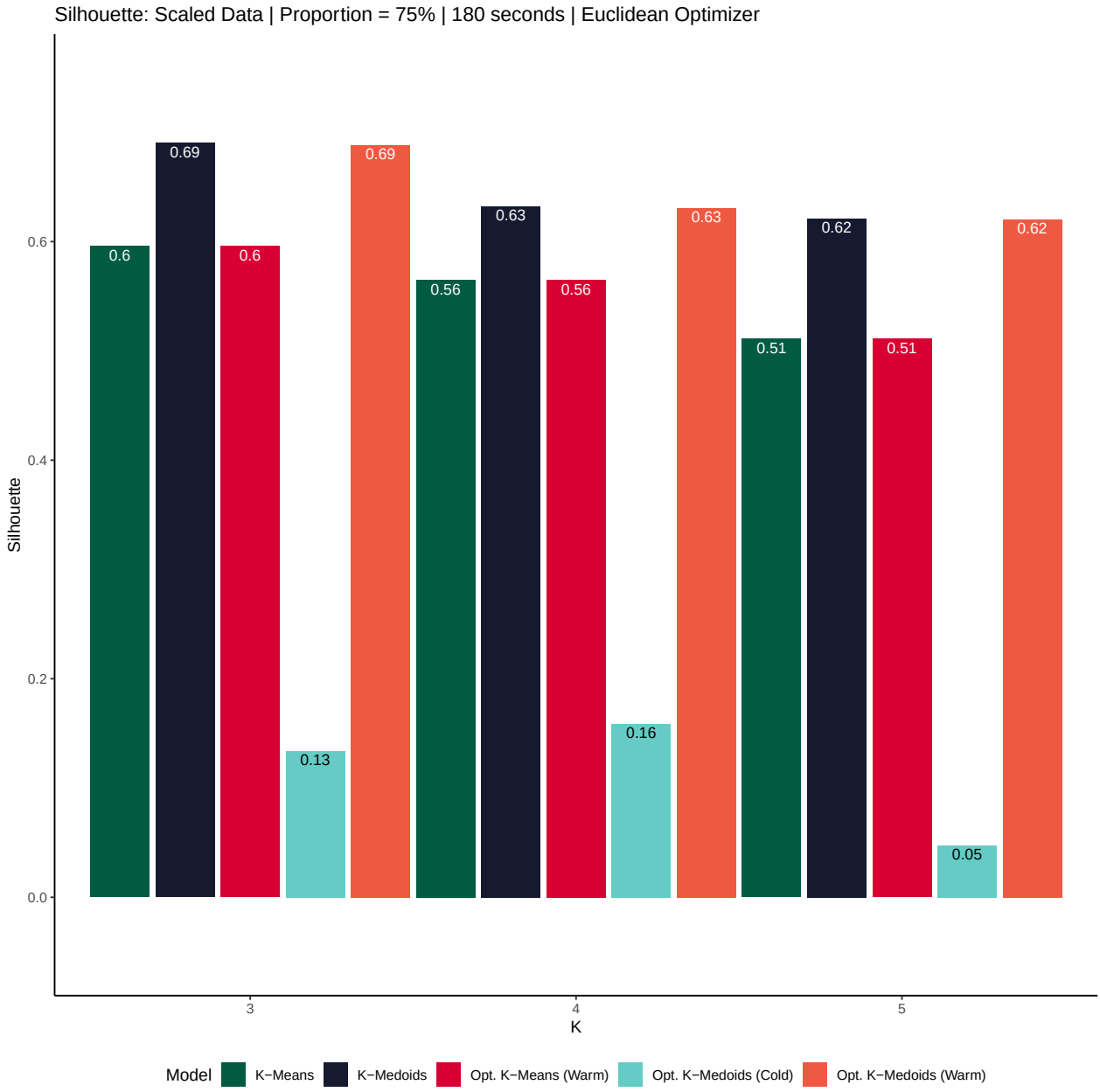

```
silhouette_individual(abalone_combined, "Scaled", 0.10, "Euclidean", 180, -0.05, 0.75)
```




```
silhouette_individual(abalone_combined, "Scaled", 0.25, "Euclidean", 180, -0.05, 0.75)
```

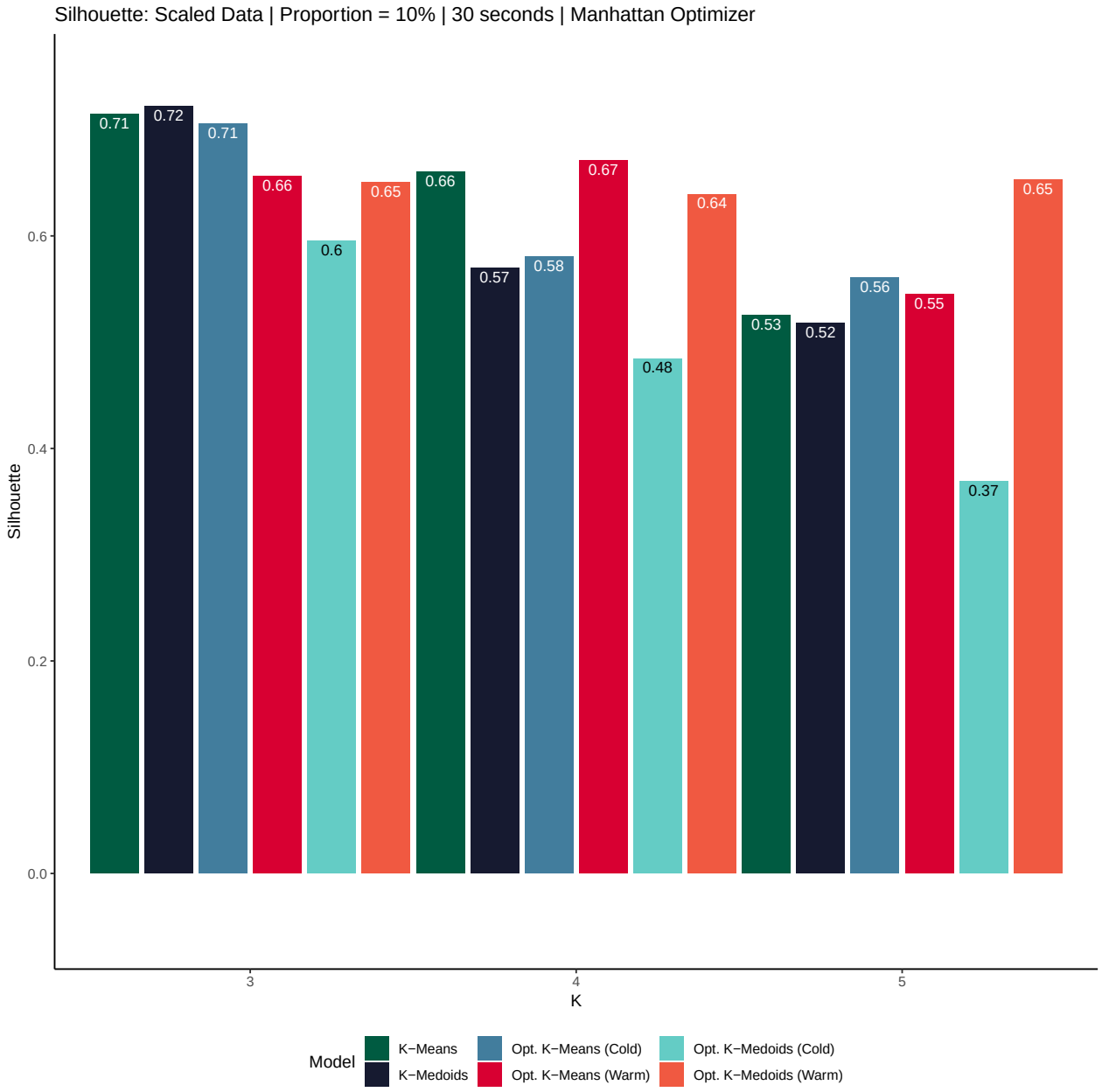



```
1 silhouette_individual(abalone_combined, "Scaled", 0.75, "Euclidean", 180, -0.05, 0.75)
```

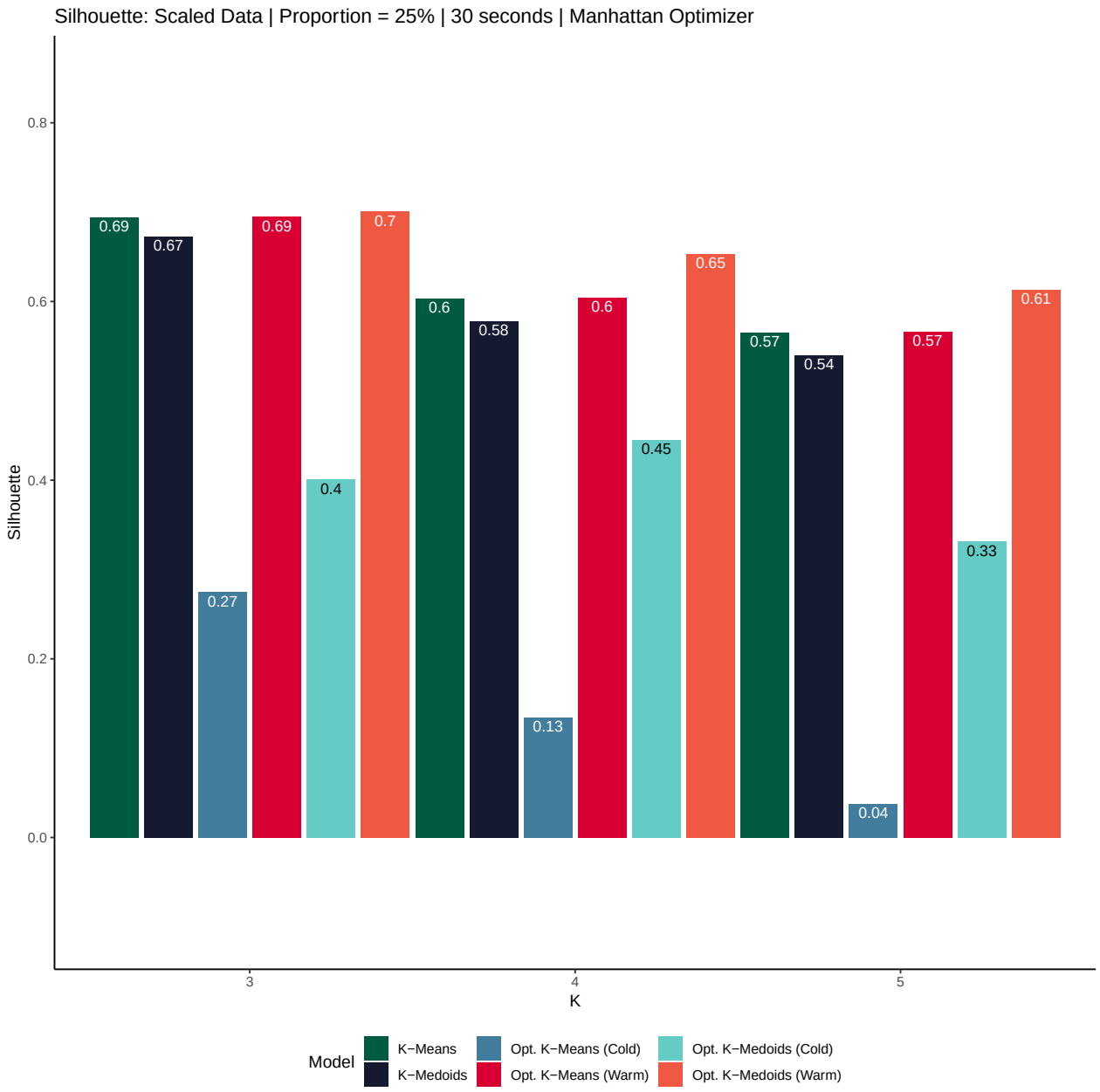


Individual Manhattan:

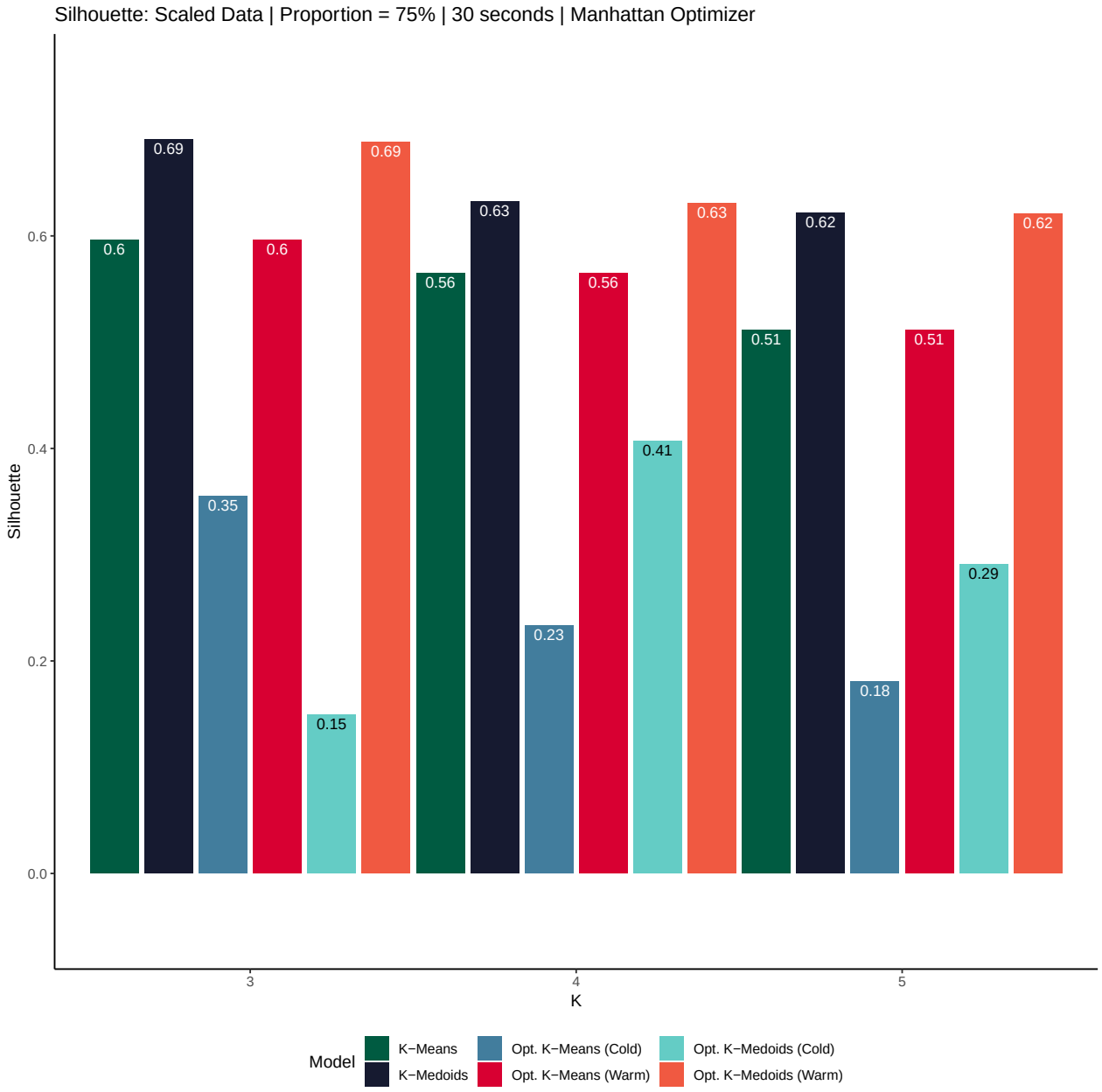
```
silhouette_individual(abalone_combined, "Scaled", 0.10, "Manhattan", 30, -0.05, 0.75)
```



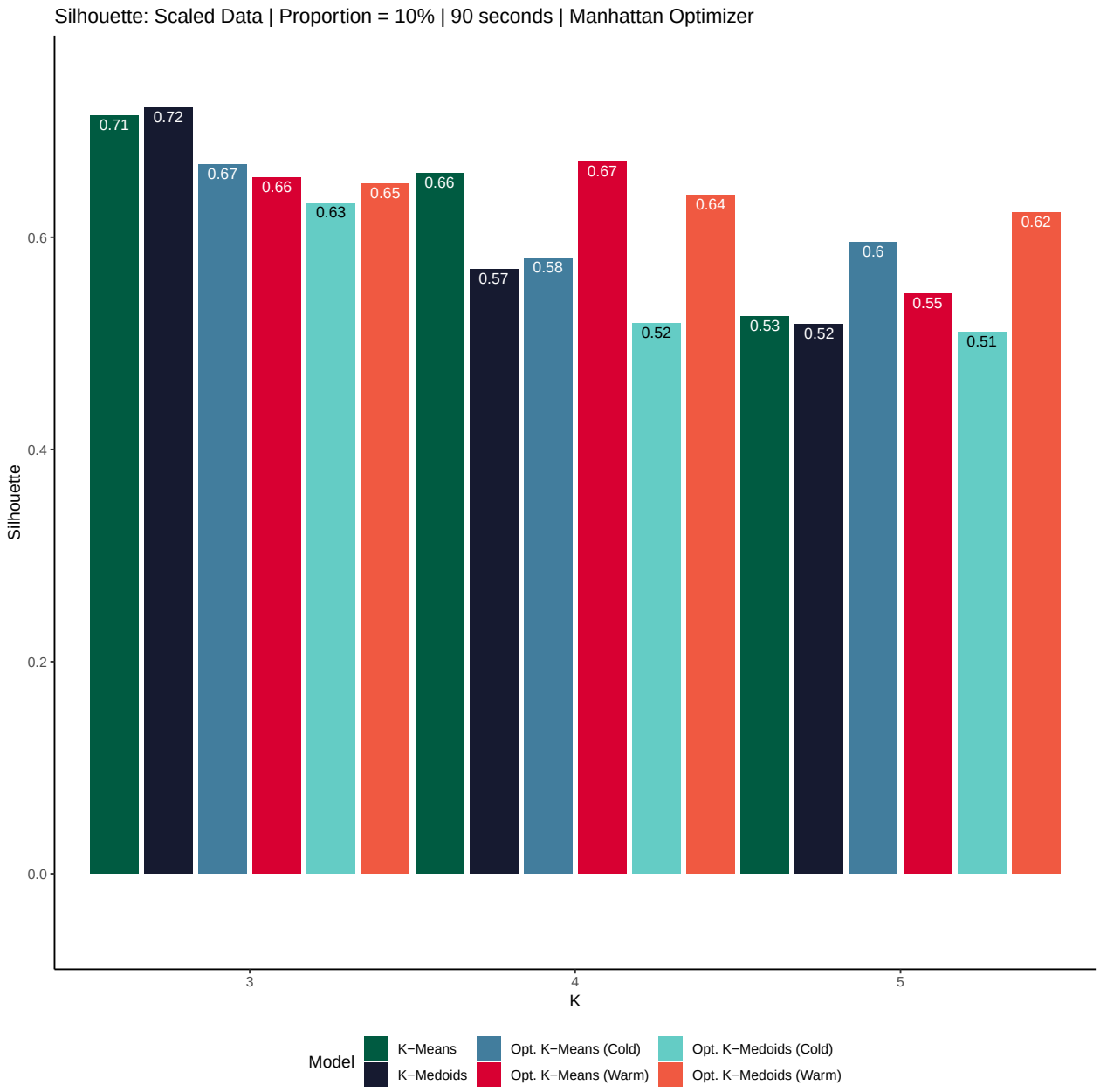

```
silhouette_individual(abalone_combined, "Scaled", 0.25, "Manhattan", 30, -0.10, 0.85)
```



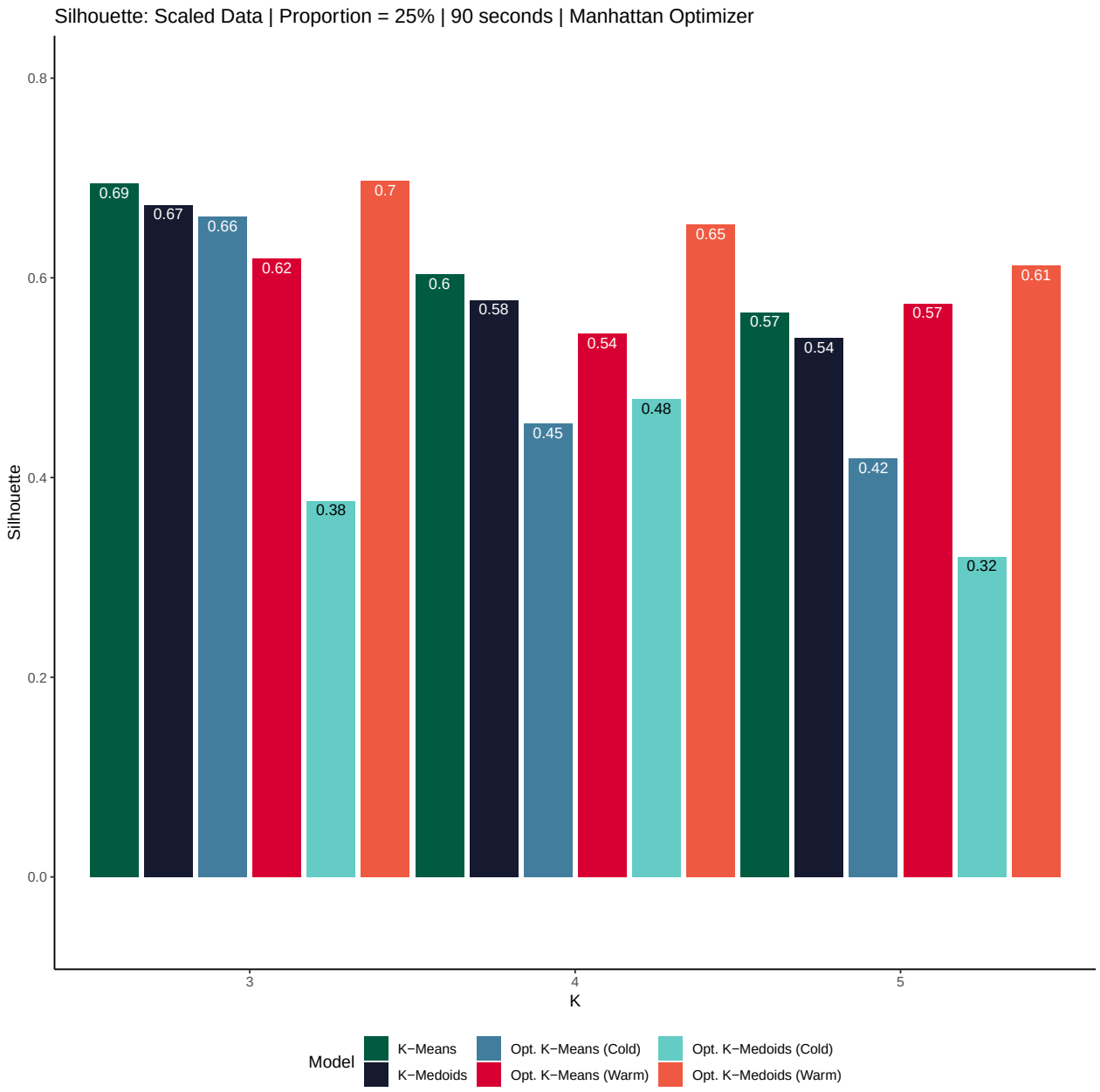

```
silhouette_individual(abalone_combined, "Scaled", 0.75, "Manhattan", 30, -0.05, 0.75)
```



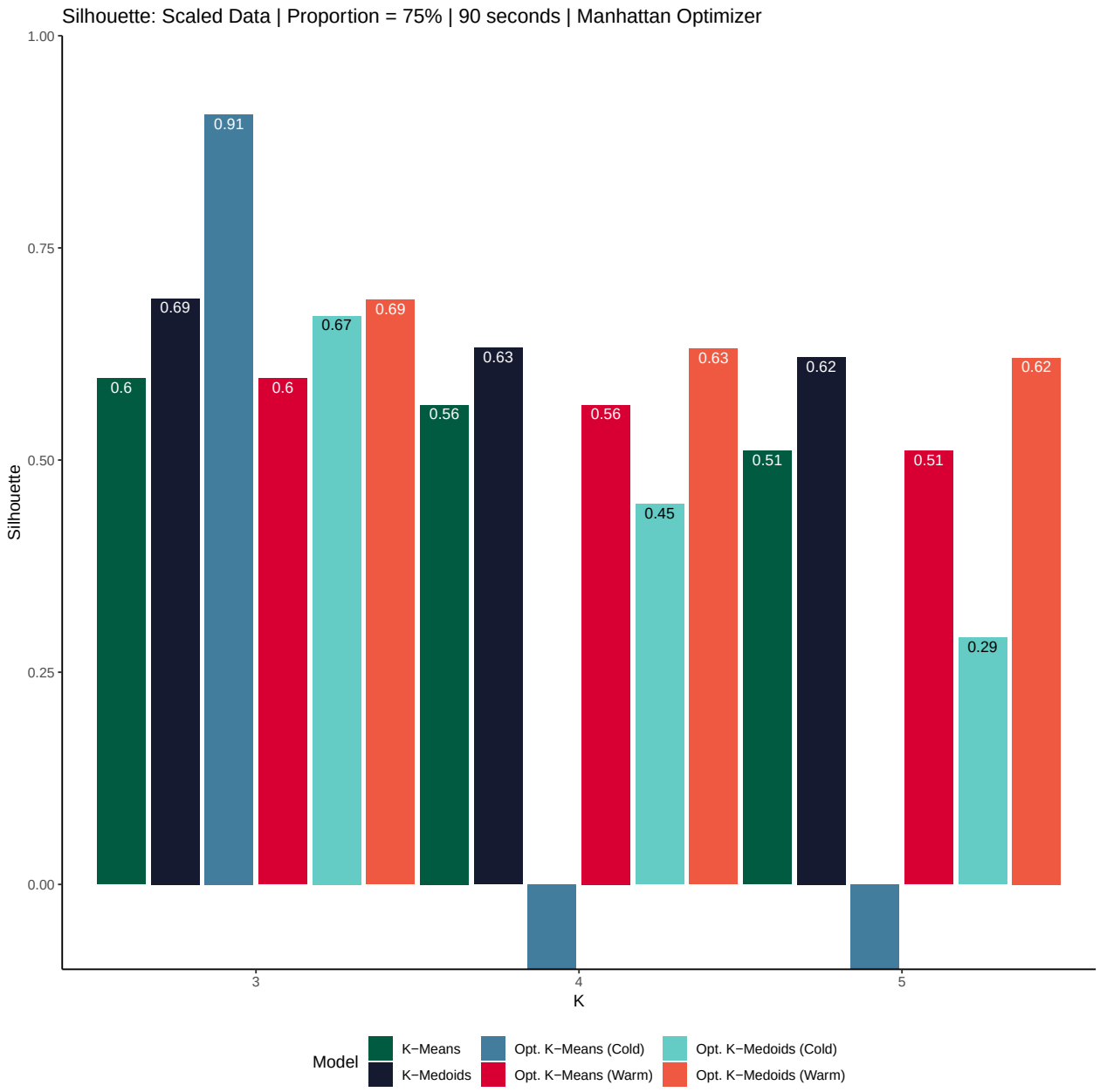

```
silhouette_individual(abalone_combined, "Scaled", 0.10, "Manhattan", 90, -0.05, 0.75)
```



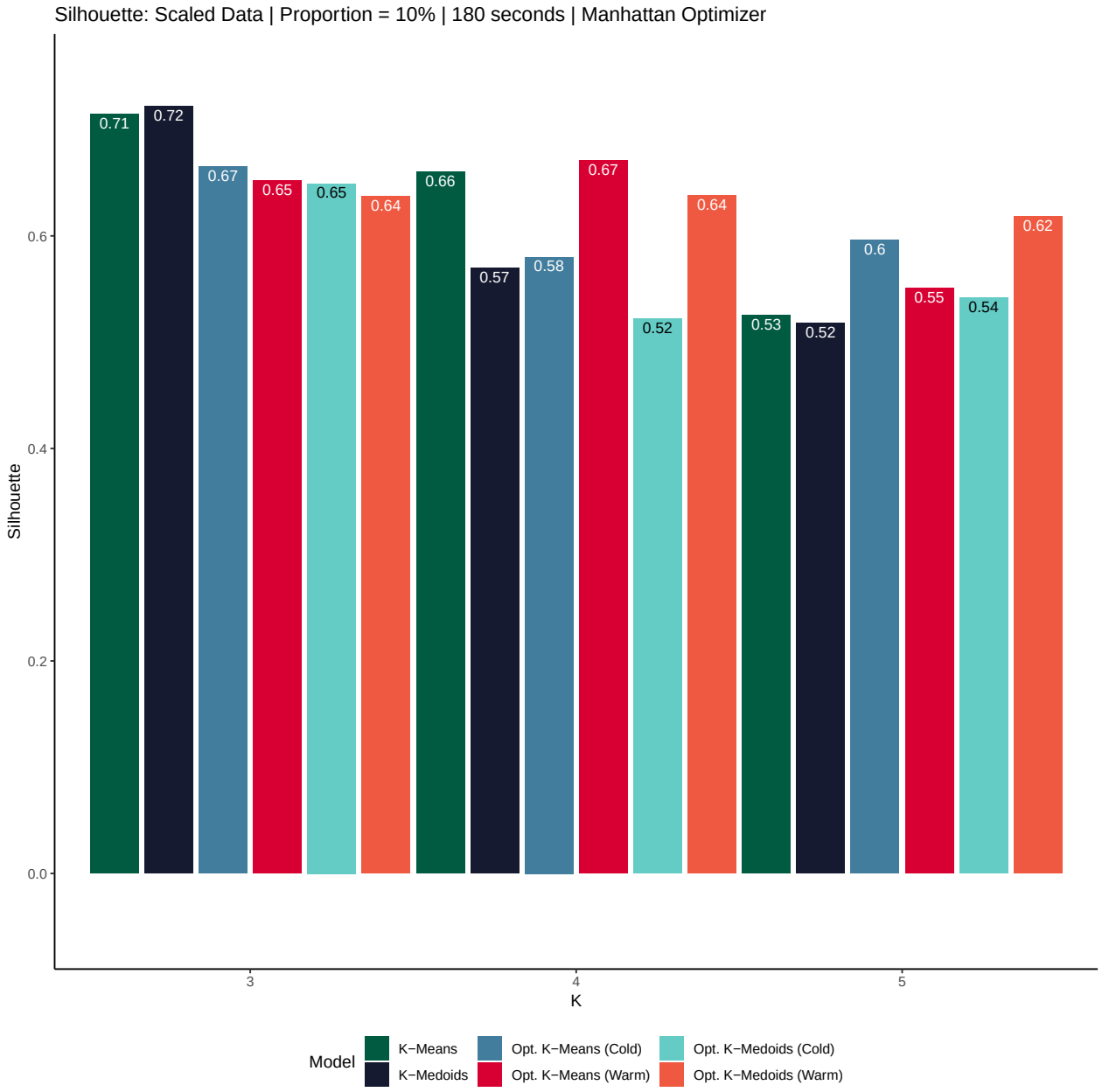

```
silhouette_individual(abalone_combined, "Scaled", 0.25, "Manhattan", 90, -0.05, 0.80)
```



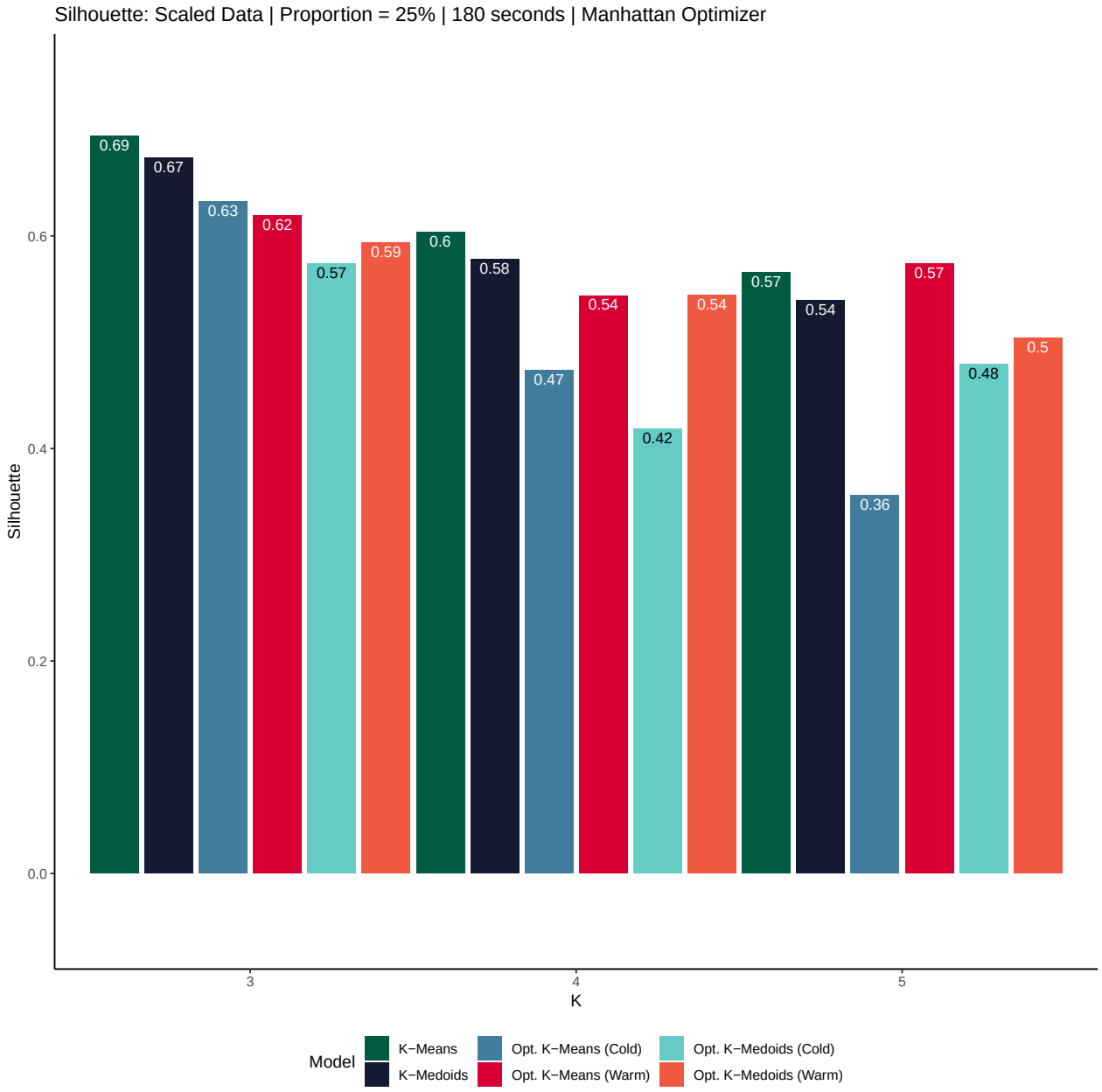

```
silhouette_individual(abalone_combined, "Scaled", 0.75, "Manhattan", 90, -0.05, 0.95)
```



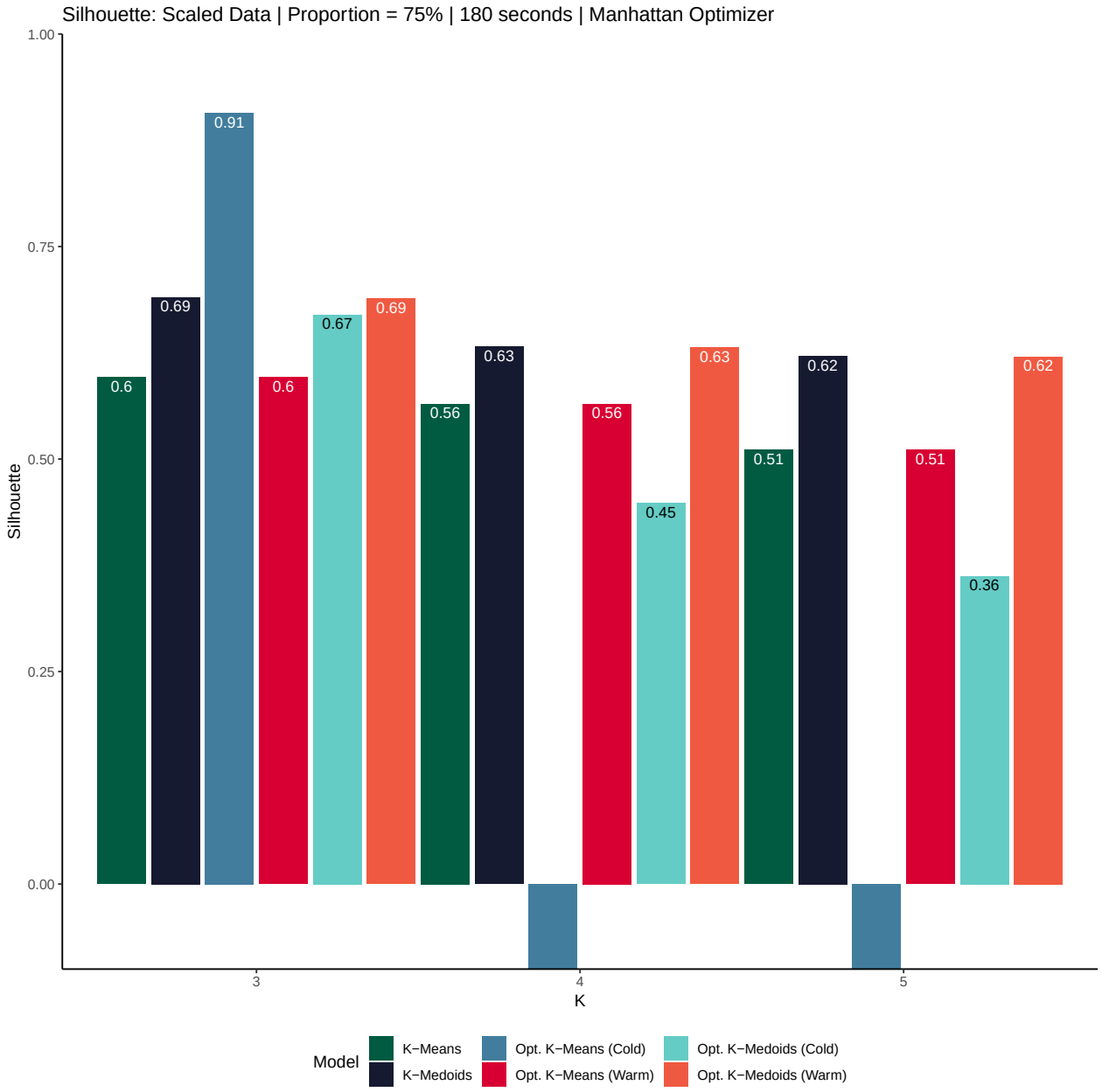

```
silhouette_individual(abalone_combined, "Scaled", 0.10, "Manhattan", 180, -0.05, 0.75)
```




```
silhouette_individual(abalone_combined, "Scaled", 0.25, "Manhattan", 180, -0.05, 0.75)
```




```
silhouette_individual(abalone_combined, "Scaled", 0.75, "Manhattan", 180, -0.05, 0.95)
```


Silhouette: Scaled Data | Proportion = 75% | 180 seconds | Manhattan Optimizer
1.00
0.75
0.50
0.25
0.00
Silhouette
0.6
0.69
0.91
0.6
0.67
0.69
0.56
0.63
0.56
0.45
0.63
0.51
0.62
0.51
0.36
0.62
3
4
5
K
Model
K−Means
K−Medoids
Opt. K−Means (Cold)
Opt. K−Means (Warm)
Opt. K−Medoids (Cold)
Opt. K−Medoids (Warm)