Result

```
PivotPaper3 <- read.csv("PivotPaper3.csv", header = TRUE)
head(PivotPaper3)
```

```
##   X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25
## 1  1  1  1  1  1  1  1  1  1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
## 2  2  2  2  2  2  2  2  2  2   2   2   2   2   2   2   2   2   2   2   2   2   2   2   2   2
## 3  3  3  3  3  3  3  3  3  3   3   3   3   3   3   3   3   3   3   3   3   3   3   3   3   3
## 4  4  4  4  4  4  4  4  4  4   4   4   4   4   4   4   4   4   4   4   4   4   4   4   4   4
## 5  5  5  5  5  5  5  5  5  5   5   5   5   5   5   5   5   5   5   5   5   5   5   5   5   5
## 6  6  6  6  6  6  6  6  6  6   6   6   6   6   6   6   6   6   6   6   6   6   6   6   6   6
##   X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40
## 1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
## 2   2   2   2   2   2   2   2   2   2   2   2   2   2   2   2
## 3   3   3   3   3   3   3   3   3   3   3   3   3   3   3   3
## 4   4   4   4   4   4   4   4   4   4   4   4   4   4   4   4
## 5   5   5   5   5   5   5   5   5   5   5   5   5   5   5   5
## 6   6   6   6   6   6   6   6   6   6   6   6   6   6   6   6
```

```
str(PivotPaper3)
```

```
## 'data.frame':    40 obs. of  40 variables:
##  $ X1 : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X2 : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X3 : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X4 : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X5 : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X6 : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X7 : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X8 : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X9 : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X10: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X11: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X12: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X13: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X14: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X15: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X16: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X17: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X18: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X19: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X20: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X21: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X22: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X23: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X24: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X25: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X26: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X27: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X28: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X29: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X30: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X31: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X32: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X33: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X34: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X35: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X36: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X37: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X38: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X39: int  1 2 3 4 5 6 7 8 9 10 ...
##  $ X40: int  1 2 3 4 5 6 7 8 9 10 ...
```

```
summary(PivotPaper3)
```

```
##        X1              X2              X3              X4              X5       
##  Min.   :1.00   Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000  
##  1st Qu.:1.00   1st Qu.:1.00   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000  
##  Median :2.0    Median :2.00   Median :2.000   Median :2.000   Median :2.000  
##  Mean   :2.0    Mean   :2.00   Mean   :2.000   Mean   :2.000   Mean   :2.000  
##  3rd Qu.:3.0    3rd Qu.:3.00   3rd Qu.:3.000   3rd Qu.:3.000   3rd Qu.:3.000  
##  Max.   :3.00   Max.   :3.00   Max.   :3.000   Max.   :3.000   Max.   :3.000  
##        X6              X7              X8              X9              X10      
##  Min.   :1.00   Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000  
##  1st Qu.:1.00   1st Qu.:1.00   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000  
##  Median :2.00   Median :2.00   Median :2.000   Median :2.000   Median :2.000  
##  Mean   :2.00   Mean   :2.00   Mean   :2.000   Mean   :2.000   Mean   :2.000  
##  3rd Qu.:3.00   3rd Qu.:3.00   3rd Qu.:3.000   3rd Qu.:3.000   3rd Qu.:3.000  
##  Max.   :3.00   Max.   :3.00   Max.   :3.000   Max.   :3.000   Max.   :3.000  
##        X11             X12             X13             X14             X15      
##  Min.   :1.00   Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000  
##  1st Qu.:1.00   1st Qu.:1.00   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000  
##  Median :2.00   Median :2.00   Median :2.000   Median :2.000   Median :2.000  
##  Mean   :2.00   Mean   :2.00   Mean   :2.000   Mean   :2.000   Mean   :2.000  
##  3rd Qu.:3.00   3rd Qu.:3.00   3rd Qu.:3.000   3rd Qu.:3.000   3rd Qu.:3.000  
##  Max.   :3.00   Max.   :3.00   Max.   :3.000   Max.   :3.000   Max.   :3.000  
##        X16             X17             X18             X19             X20      
##  Min.   :1.00   Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000  
##  1st Qu.:1.00   1st Qu.:1.00   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000  
##  Median :2.00   Median :2.00   Median :2.000   Median :2.000   Median :2.000  
##  Mean   :2.00   Mean   :2.00   Mean   :2.000   Mean   :2.000   Mean   :2.000  
##  3rd Qu.:3.00   3rd Qu.:3.00   3rd Qu.:3.000   3rd Qu.:3.000   3rd Qu.:3.000  
##  Max.   :3.00   Max.   :3.00   Max.   :3.000   Max.   :3.000   Max.   :3.000  
##        X21             X22             X23             X24             X25      
##  Min.   :1.00   Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000  
##  1st Qu.:1.00   1st Qu.:1.00   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000  
##  Median :2.00   Median :2.00   Median :2.000   Median :2.000   Median :2.000  
##  Mean   :2.00   Mean   :2.00   Mean   :2.000   Mean   :2.000   Mean   :2.000  
##  3rd Qu.:3.00   3rd Qu.:3.00   3rd Qu.:3.000   3rd Qu.:3.000   3rd Qu.:3.000  
##  Max.   :3.00   Max.   :3.00   Max.   :3.000   Max.   :3.000   Max.   :3.000  
##        X26             X27             X28             X29             X30      
##  Min.   :1.00   Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000  
##  1st Qu.:1.00   1st Qu.:1.00   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000  
##  Median :2.00   Median :2.00   Median :2.000   Median :2.000   Median :2.000  
##  Mean   :2.00   Mean   :2.00   Mean   :2.000   Mean   :2.000   Mean   :2.000  
##  3rd Qu.:3.00   3rd Qu.:3.00   3rd Qu.:3.000   3rd Qu.:3.000   3rd Qu.:3.000  
##  Max.   :3.00   Max.   :3.00   Max.   :3.000   Max.   :3.000   Max.   :3.000  
##        X31             X32             X33             X34             X35      
##  Min.   :1.00   Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000  
##  1st Qu.:1.00   1st Qu.:1.00   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000  
##  Median :2.00   Median :2.00   Median :2.000   Median :2.000   Median :2.000  
##  Mean   :2.00   Mean   :2.00   Mean   :2.000   Mean   :2.000   Mean   :2.000  
##  3rd Qu.:3.00   3rd Qu.:3.00   3rd Qu.:3.000   3rd Qu.:3.000   3rd Qu.:3.000  
##  Max.   :3.00   Max.   :3.00   Max.   :3.000   Max.   :3.000   Max.   :3.000  
##        X36             X37             X38             X39             X40      
##  Min.   :1.00   Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000  
##  1st Qu.:1.00   1st Qu.:1.00   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000  
##  Median :2.00   Median :2.00   Median :2.000   Median :2.000   Median :2.000  
##  Mean   :2.00   Mean   :2.00   Mean   :2.000   Mean   :2.000   Mean   :2.000  
##  3rd Qu.:3.00   3rd Qu.:3.00   3rd Qu.:3.000   3rd Qu.:3.000   3rd Qu.:3.000  
##  Max.   :3.00   Max.   :3.00   Max.   :3.000   Max.   :3.000   Max.   :3.000
```

```
PivotPaper3_r <- as.data.frame(scale(PivotPaper3[,]))
head(PivotPaper3_r)
```

```
##          X1         X2         X3         X4         X5         X6         X7
## 1 -1.713926 -1.790282  -1.536098 -1.2053370 -1.2044411 -1.7114834 -1.7114834
## 2 -1.713926 -1.790282  -1.536098 -1.2053370 -1.2044411 -1.7114834 -1.7114834
## 3 -1.713926 -1.790282  -1.536098 -1.2053370 -1.2044411 -1.7114834 -1.7114834
## 4 -1.713926 -1.790282  -1.536098 -1.2053370 -1.2044411 -1.7114834 -1.7114834
## 5 -1.713926 -1.790282  -1.536098 -1.2053370 -1.2044411 -1.7114834 -1.7114834
## 6 -1.713926 -1.790282  -1.536098 -1.2053370 -1.2044411 -1.7114834 -1.7114834
##          X8         X9        X10        X11        X12        X13        X14
## 1 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 2 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 3 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 4 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 5 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 6 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
##         X15        X16        X17        X18        X19        X20        X21
## 1 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 2 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 3 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 4 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 5 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 6 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
##         X22        X23        X24        X25        X26        X27        X28
## 1 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 2 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 3 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 4 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 5 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 6 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
##         X29        X30        X31        X32        X33        X34        X35
## 1 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 2 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 3 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 4 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 5 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 6 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132 -1.7113132
##         X36        X37        X38        X39        X40
## 1 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 2 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 3 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 4 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 5 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132
## 6 -1.711483 -1.7113132 -1.7113132 -1.7113132 -1.7113132
```

```
colnames(as.data.frame(scale(PivotPaper3[,])))
```

```
##  [1] X1  X2  X3  X4  X5  X6  X7  X8  X9  X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20
## [21] X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40
## 40 Levels: X1 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X2 X20 X21 X22 X23 X24 X25 ... X9
```

```
library(NbClust)
NbClust(PivotPaper3_r, use = "complete.obs")
```

```
## 
## Silhouette Coefficient of  2 clusters: 0.9999999
## 
## Silhouette Coefficient of  3 clusters: 0.9999999
## 
## Silhouette Coefficient of  4 clusters: 0.9999999
## 
## Silhouette Coefficient of  5 clusters: 0.9999999
## 
## Silhouette Coefficient of  6 clusters: 0.9999999
## 
## Silhouette Coefficient of
```