Further information on survey design and PCA groupings

The survey questions were designed to examine a) the norms and practices themes of the Energy Culture Framework, and b) the wider external influences on employee energy behaviours. They were loosely designed around the following themes:

- Colleagues/work team energy actions
- Workplace energy efficiency and reduction knowledge
- Organistional influences
- Energy concern and business concern
- Workplace Energy Reduction Practices
- Employee energy suggestions and communication
- Perceived pressure from line manager and colleagues
- Attitudes and energy practices at home
- Energy importance for business

The PCA process grouped the majority of items in a similar way to the themes above, however there was some variations. Table 1 provides further details on the composition of the questions in each PCA group and what theme they were originally designed under. Table 2 lists each question in each PCA grouping, and highlights the original design theme. It also details how each question was developed and stated the source of the question where appropriate.

Table 1: Comments on the PCA suggested grouping of factors (questions) and how they are similar or different to the original questionnaire design themes

PCA Group	Similarities and differences to the design themes
1 - Employee attitudes and subjective norms	This group includes all questions that were originally designed in the themes of *'Colleagues/Work team energy/actions'* and '*Perceived pressure from line manager and colleagues'.* It also includes one variable originally designed under the *'Organisational influence'* group. Reviewing the PCA grouping of these questions highlighted they all address employee attitudes and subjective norms.
2 - Employee energy suggestions and feedback	This group includes all the questions that were originally designed in '*Employee energy suggestions and communications'* are in this grouping.
3 - Concern of business energy use, demand and cost	This group includes all the questions that were originally designed in the '*Energy concen and business concern'* and '*Enegy importance for business'* themes. Reviewing the PCA grouping of these questions highlighted they all address '*concern of business energy use, demand and cost*'.
4 - Home Energy Practices	This group consists of all the questions that were originally designed in the '*Atttiudes and energy practices at home'* theme and also has the addition of one question which was originally themed in the '*Energy concen and business concern'* group. The wording of this question did not specify workplace behaviours, and asks generally about day-to-day behaviours which fits with the theme of *'home energy practices'.*
5 - Workplace Energy Reduction Practices	This group includes all the questions originally designed in the *'Workplace energy behaviours/actions/self-reporting'* theme.
6 - Workplace Energy Reduction Knowledge	This group includes questions which were previously grouped together in the '*Work place energy efficiency and Reduction Knowledge*' theme.
7 - Workplace Energy Approaches	This is a mixed group, which consists of questions previously grouped under the themes of :'*organisational influence' and Workplace Energy Efficiency and Reduction Knowledge*' themes. Even though this group consists of a variety of variables, reviewing the PCA grouping identifies that all these questions examine '*workplace energy approaches'.*
8 - Role of the SHE function	Includes two variables that were originally grouped together in the '*organisational influence'* theme. However, these questions specifically ask about the SHE function within the business, so this was an appropriate categorisation.

*Table 2: The PCA groups and the questions included in each group, along with details on how each question was developed including information on whether they were researcher developed, adapted or directly from other sources. Final column of table highlights the original theme that the question was developed to address. ** highlights where a question was originally designed under a slightly different theme*

PCA Grouping	Questions	Details on how the question was developed	Theme of initial survey design
1 – Employee attitudes and subjective norms	Within my specific work team we are conscious of our energy use	Similar to Dixon et al., (2014:124) ' Most people I work with, who are important to me, try to pay attention to their energy use'	Colleague/ work team energy actions
	Within my work environment energy use and demand are discussed regularly	Adapted from Ucci et al., (2014:45) Q16	Colleague/ work team energy actions
	I discuss ways to reduce energy use and demand with my work colleagues	Ucci et al., (2014:45) Q16	Colleague/ work team energy actions
	Within my specific work team we regularly try to reduce our energy use	Similar to Dixon et al., (2014:124) 'Many people I work with are trying to reduce their energy use'	Colleague/ work team energy actions
	I would be well thought of by my colleagues if I took action to save energy at work	Ucci et al., (2014:45) Q17	**Pressure from line manager / colleagues
	My line manager influences my energy use	Researcher developed but influence by subject norm theme of Ajzen (1991) Theory of Planned behaviour.	**Organisational influences
	I would be well thought of by my line manager if I took actions to save energy at work	Ucci et al., (2014:45) Q18	**Pressure from line manager / colleagues
	Colleagues within my work environment support the need to reduce energy use	Ucci et al., (2014:45) Q18 Also similar to Dixon et al., (2014:124) ' any people I work with are trying to reduce their energy use)	Colleague/ work team energy actions
2 – Employee energy suggestions and feedback	If I make a suggestion on how to reduce energy use and demand it will be taken seriously	This block of questions were developed in response to the pilot study. During the pilot study some participants stated they were uncertain whether their views were being heard and acted upon.	Employee energy suggestions and communication
	If I make a suggestion, I will receive a response detailing any changes or reasons for not implementing the suggestion		Employee energy suggestions and communication
	Employees are encouraged to make suggestions which can reduce energy use and demand		Employee energy suggestions and communication
	If I have a suggestion on how to reduce energy use and demand at work I know who to speak to		Employee energy suggestions and communication
3 – Concern of business energy use, demand and cost	Reducing energy demand should be a higher priority for the business	Adapted from Ucci et al., (2014:42) Q2	Energy concern and business concern
	Energy demand is an important issue for the business	Ucci et al., (2014:43) Q8	**Energy importance for business
	Reducing energy use should be a higher priority for the business	Adapted from Ucci et al., (2014:42) Q2	Energy concern and business concern
	Energy use is an important issue for the business	Ucci et al., (2014:43) Q8	**Energy importance for business
	I am concerned about the cost of energy to the business	Researcher developed to examine energy attitudes in the workplace	Energy concern and business concern
4 – Home Energy Practices	At home I always make an effort to reduce energy use	Researcher developed, with influence from Lee et al., (1995) and the questions developed in workplace energy.	Attitude and energy practices at home
	At home I always leave electrical goods off at the mains socket when not in use		Attitude and energy practices at home
	At home I am concerned about rising energy prices		Attitude and energy practices at home
	At home I always turn lights off after I leave a room		Attitude and energy practices at home
	I am concerned that rising energy costs will affect my day-to-day tasks		**Energy concern and business concern
	At home rising costs have affected my day-to-day tasks		Attitude and energy practices at home
5 – Workplace Energy Reduction Practices	At work I always turn equipment, which I personally use, off after I have finished using it	Adapted from Dixon et al., (2014:124), Chen et al (2014:28) and Ucci et al., (2014:48) . Dixon et al., (2014) use a 6 item index to examine turning off lights, putting computer to sleep or standby, printing double sided, minimising overhead lights, swtiching off hall/restroom lights, turn off computer monitor. Chen et al., (2014) include statements which address turning off computers/lights when not in use.	Workplace energy behaviours/actions/self-reporting
	At work I always turn equipment off at the end of the day/shift		Workplace energy behaviours/actions/self-reporting
	At work I always make an effort to reduce energy use within the workplace		Workplace energy behaviours/actions/self-reporting

	At work if I am the only person in an area, I always turn lights off after I leave that area	Ucci et al., (2014) includes statements such as 'When I leave a room/space that is unoccupied, I always turn off the lights, I always turn off a piece of machinery during down times'.	Workplace energy behaviours/actions/self-reporting
6 – Workplace Energy Reduction Knowledge	It is clear to me who is responsible for switching off the lights	Ucci et al., (2014:46) Q24	Workplace Energy Reduction Knowledge
	It is clear to me who is responsible for switching machines/equipment off during downtimes	Ucci et al., (2014:48) Q23	Workplace Energy Reduction Knowledge
	If I wanted to turn equipment/machines off in my work area I know where the relevant switches are	Ucci et al., (2014:47) F21	Workplace Energy Reduction Knowledge
7 – Workplace Energy Approaches	I have received enough training on energy saving at work	Ucci et al., (2014:44) Q15	**Organisational influences
	I get enough supervision and guidance on saving energy at work	Ucci et al., (2014:44) Q13	**Organisational influences
	It is clear to me what the business are doing to reduce energy use and demand	Ucci et al., (2014:43) Q9	Workplace Energy Efficiency and Reduction Knowledge
	I know the amount of energy my team/department use	Ucci et al., (2014:44) Q10	Workplace Energy Efficiency and Reduction Knowledge
8 – Role of the SHE function	The SHE function influence how I use energy in work	Developed in response to the pilot study, where participants highlighted how the SHE function has a role in their day-to-day tasks and energy use.	Organisational influences
	I associate energy related topics with the SHE function		Organisational influences

Questions originally in survey but removed during the PCA process

Q13c 'If I notice a fault with equipment I am using, I always report this to my line manager',	Adapted from Ucci et al., (2014) Page 48 Q32
Q13d I am more conscious of energy use than my work colleagues'	Researcher developed
Q14b at home 'I always leave electrical goods on standby when not in use'	Adapted from Dixon et al., (2014:124), Chen et al (2014:28) and Ucci et al., (2014:48) (similar to above).

Aim of focus groups

- **Can more understanding of the energy cultures of the manufacturing and office environments**

Do you think about how much energy your using when conducting work tasks?

Do you want to know how much energy you use?

Are energy topics discussed in the work? How is energy talked about?

Do you get information on the energy you use?

Who do you think is responsible for reducing energy in the workplace?

Do you get any training on topics related to energy use?

Are you aware of any infrastructure on site (including within different buildings) that's goal is to improve energy efficiency or reduce energy use?

Are you concerned about energy costs to the business?

Are you aware of shutdown plans for holidays?

Do you know how to turn off everything in your immediate work area?

What approaches do you think should be taken to try and reduce energy use on site?

Where do you see energy as a priority for the site? In relation to all other priorities.

Communication

How do you get information?

How would you like messages to be transferred to you?

(specifically interested in manufacturing responses – those that don't use computers on day-to-day basis)

Can you make suggestions about ways to save energy? And how do you do this?

- Follow up – do you think the suggestions are taken serious?
- How would you like to offer suggestions?

Survey findings

Highlight to the group that early survey findings indicate differences between office and manufacturing areas, ask the group why they think differences might exist?

Differences in manufacturing wanting more supervision and guidance than office environments.

Results of Varimax rotation of Principal Component Analysis. Component numbers correspond to the group numbers in Table 1 of main transcript.

	Components								
Variables	1	2	3	4	5	6	7	8	Communalities
Q10b	**.771**	.018	-.029	.057	.022	.080	.130	.000	.622
Q10d	**.719**	.135	.045	.123	-.018	-.008	**.308**	-.051	.650
Q10e	**.696**	-.002	.000	.177	.039	.083	.159	-.045	.552
Q10h	**.690**	.081	.186	.001	.090	.144	-.199	**.376**	.727
Q10c	**.689**	.030	.014	.050	.094	.141	.192	.049	.547
Q10a	**.637**	.222	-.045	.094	.037	.119	.122	.103	.506
Q10g	**.628**	.067	.119	-.012	-.006	.189	-.077	**.370**	.591
Q10f	**.605**	.026	.177	.100	.036	.205	.008	.044	.453
Q9h	.111	**.953**	.086	.009	.039	.093	-.011	.030	.939
Q9i	.064	**.945**	.015	.031	.017	.041	-.046	-.012	.902
Q9j	.107	**.927**	.048	.053	.026	.059	.094	.033	.889
Q9g	.111	**.893**	.031	.038	.089	-.008	.103	.010	.831
Q9c	.060	.008	**.731**	.164	.127	-.088	-.048	-.067	.595
Q9d	.050	.040	**.692**	.170	.134	-.081	-.043	.003	.538
Q9a	-.028	-.012	**.691**	.009	.075	.088	.132	.090	.517
Q9b	.038	.065	**.644**	.018	.103	.102	.117	.098	.466
Q13a	.226	.068	**.417**	.234	-.018	.220	.026	.015	.334
Q14e	.017	.015	.123	**.750**	.164	.070	.052	-.019	.613
Q14c	.025	.059	-.010	**.629**	.126	.031	.057	.008	.420
Q15a	.041	.047	.254	**.557**	.114	-.071	-.032	.091	.406
Q14a	.025	-.044	.154	**.536**	**.303**	.014	.004	.181	.439
Q13b	.280	.117	.239	**.462**	-.014	.091	-.080	-.015	.378
Q15b	.168	-.027	-.037	**.455**	-.032	.032	-.102	.010	.250
Q12a	.029	.079	.132	.180	**.850**	.050	.033	.132	.801
Q12b	.027	.085	.136	.150	**.805**	.073	.059	.042	.708
Q12d	.228	.034	.208	.259	**.542**	.288	.117	-.027	.555
Q12c	.070	-.004	.140	.118	**.437**	**.419**	-.011	-.016	.405
Q13f	.148	.039	.004	.012	.171	**.740**	.135	.065	.623
Q13e	.149	.075	.052	-.006	.097	**.598**	.218	.108	.456
Q13g	.193	.030	-.006	.058	-.002	**.443**	.039	.042	.242
Q8b	.228	-.035	.097	-.092	.016	.271	**.672**	.213	.642
Q8a	.245	.037	.073	-.081	.044	.293	**.646**	.228	.630
Q9f	**.419**	.153	.200	.022	.154	.137	**.487**	.158	.544
Q8c	**.366**	**.316**	-.048	.041	.098	-.050	**.408**	.051	.419
Q1db	.111	.045	.021	.022	.015	.105	.173	**.681**	.517
Q1da	.119	-.016	.068	.157	.121	.050	.187	**.649**	.520

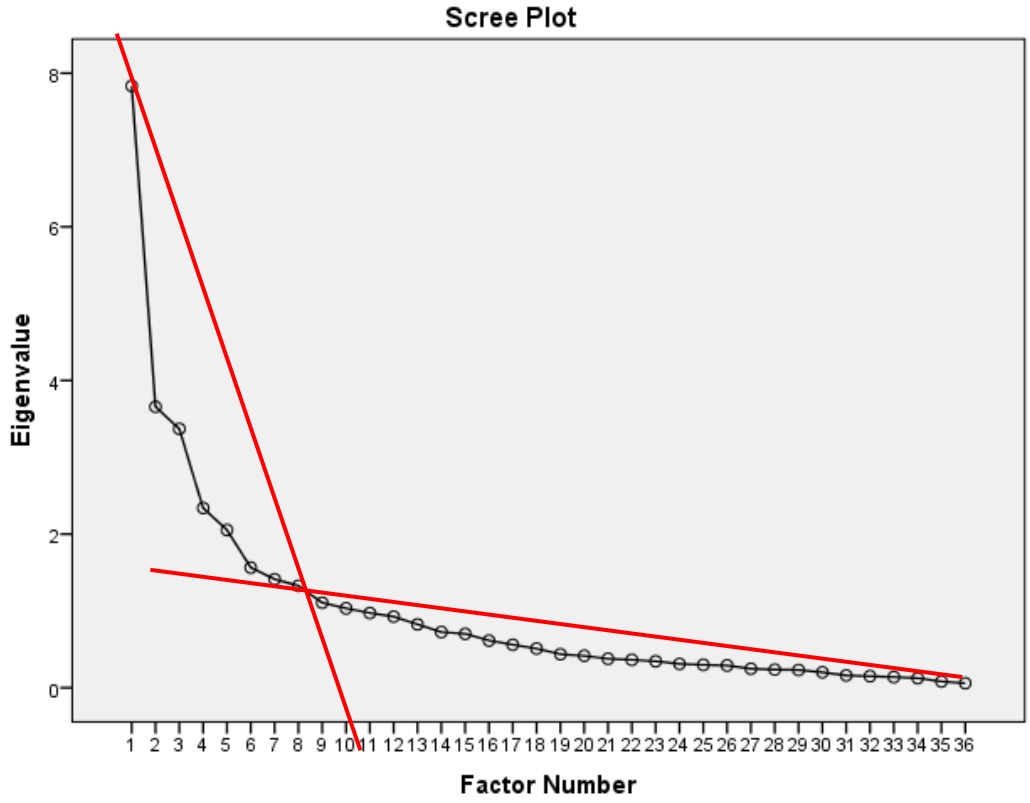


Figure 1: Scree Plot produced from PCA with Varimax Rotation Note: red lines reflect visual indications produced by the researcher

This remainder of this document first presents the outputs from SPSS detailing the independent t-test results for each group. Within each group there are multiple tests run based on whether outliers were removed from the sample. Within the output the researcher has provided notes detailing why different tests were conducted. Due to several groups not having similar distributions of data, even after the removal of outliers, Mann-Whitney U tests were conducted. The results of these tests is presented at the end of the output.

**********GROUP 1 - STEP 1**
RUN DESCRIPTIVE ANALYSIS AND T-TEST

```
EXAMINE VARIABLES=Group1PCA BY OfficeOrManufacturing
/PLOT BOXPLOT HISTOGRAM NPPLOT
/COMPARE GROUPS
/STATISTICS DESCRIPTIVES
/CINTERVAL 95
/MISSING LISTWISE
/NOTOTAL.

T-TEST GROUPS=OfficeOrManufacturing(1 2)
/MISSING=ANALYSIS
/VARIABLES=Group1PCA
/CRITERIA=CI(.95).
```

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group1PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

	What the building area is predominately used for			Statistic	Std. Error
Group1PCA	Office	Mean		23.3333	.56265
		95% Confidence Interval for Mean	Lower Bound	22.2192	
			Upper Bound	24.4474	
		5% Trimmed Mean		23.2500	
		Median		23.0000	
		Variance		37.989	
		Std. Deviation		6.16351	
		Minimum		8.00	
		Maximum		40.00	
		Range		32.00	
		Interquartile Range		8.75	
		Skewness		.199	.221
		Kurtosis		.111	.438
	Manufacturing	Mean		21.6838	.39395
		95% Confidence Interval for Mean	Lower Bound	20.9047	
			Upper Bound	22.4629	
		5% Trimmed Mean		21.7386	
		Median		22.0000	
		Variance		21.107	
		Std. Deviation		4.59420	
		Minimum		8.00	
		Maximum		31.00	
		Range		23.00	
		Interquartile Range		6.00	
		Skewness		-.091	.208
		Kurtosis		.135	.413

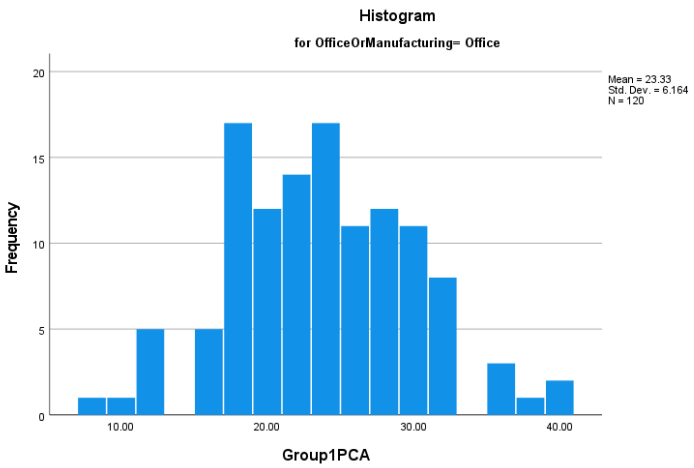
Tests of Normality

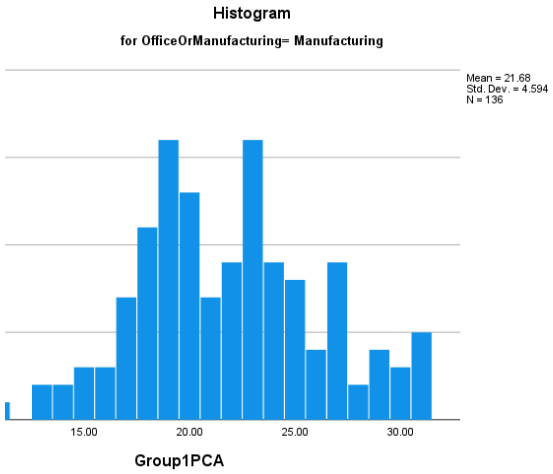
	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group1PCA	Office	.067	120	.200*	.988	120	.379
	Manufacturing	.084	136	.019	.982	136	.071

*. This is a lower bound of the true significance.

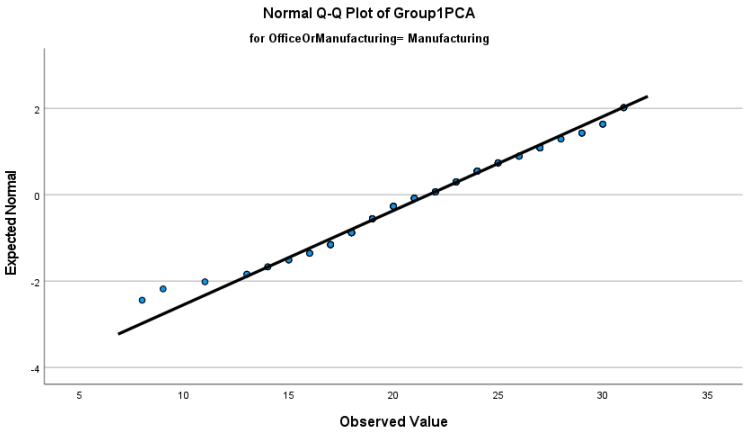
a. Lilliefors Significance Correction

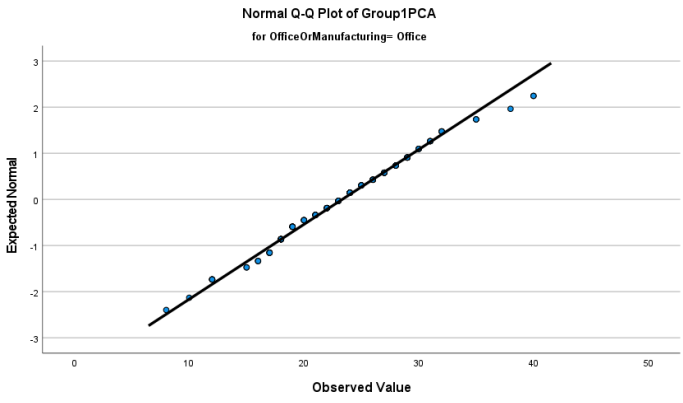
Group1PCA
Histograms

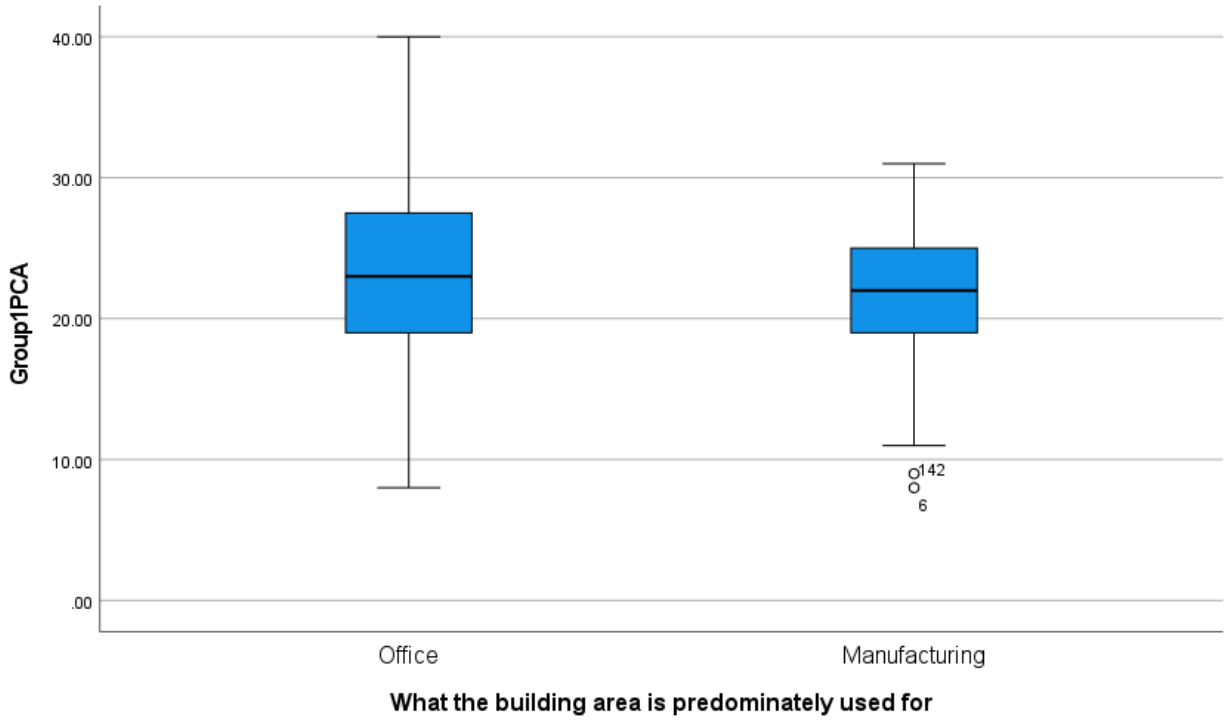




Normal Q-Q Plots







T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group1PCA	Office	120	23.3333	6.16351	.56265
	Manufacturing	136	21.6838	4.59420	.39395

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group1PCA	Equal variances assumed	9.390	.002	2.445	254	.008	.015	1.64951	.67465	.32089	2.97813
	Equal variances not assumed			2.402	218.077	.009	.017	1.64951	.68685	.29579	3.00323

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Group1PCA	Cohen's d	5.38665	.306	.059	.553

	Hedges' correction	5.40262	.305	.059	.551
	Glass's delta	4.59420	.359	.109	.608

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

**********Remove 142 and 6 from the dataset, as these have been identified as outliers, and re-run the descripives and t-tes**

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group1PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	134	100.0%	0	0.0%	134	100.0%

Descriptives

	What the building area is predominately used for			Statistic	Std. Error
Group1PCA	Office	Mean		23.3333	.56265
		95% Confidence Interval for Mean	Lower Bound	22.2192	
			Upper Bound	24.4474	
		5% Trimmed Mean		23.2500	
		Median		23.0000	
		Variance		37.989	
		Std. Deviation		6.16351	
		Minimum		8.00	
		Maximum		40.00	
		Range		32.00	
		Interquartile Range		8.75	
		Skewness		.199	.221
		Kurtosis		.111	.438
	Manufacturing	Mean		21.8806	.37424
		95% Confidence Interval for Mean	Lower Bound	21.1404	
			Upper Bound	22.6208	
		5% Trimmed Mean		21.8532	
		Median		22.0000	
		Variance		18.768	
		Std. Deviation		4.33216	
		Minimum		11.00	
		Maximum		31.00	
		Range		20.00	
		Interquartile Range		6.00	
		Skewness		.183	.209

	Kurtosis	-.362	.416

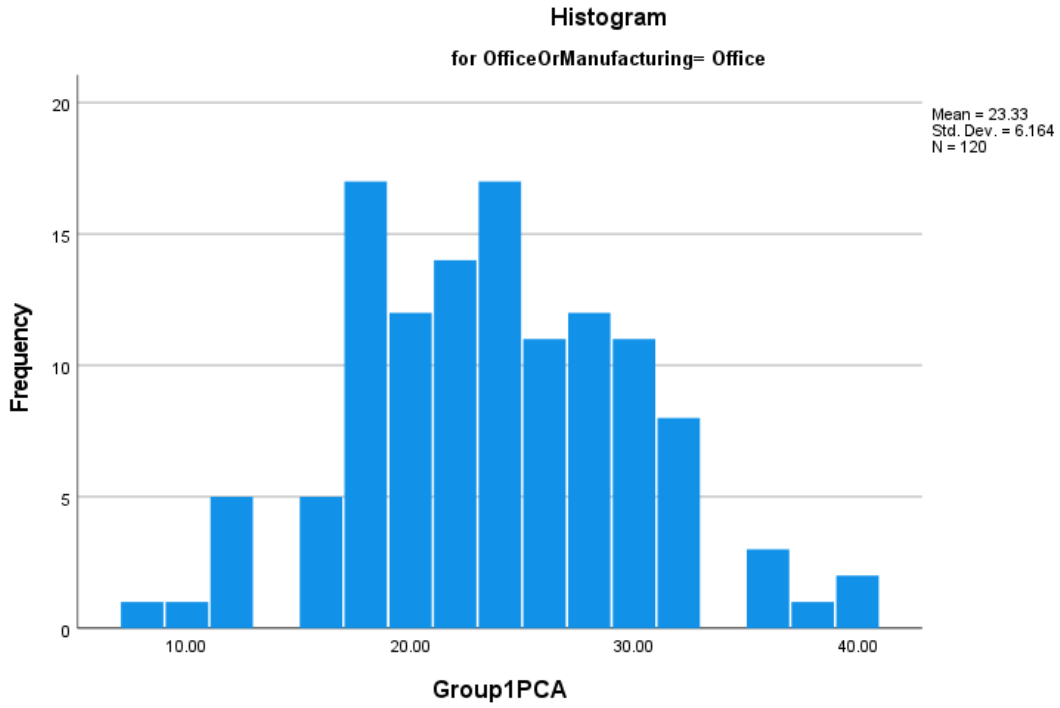
Tests of Normality

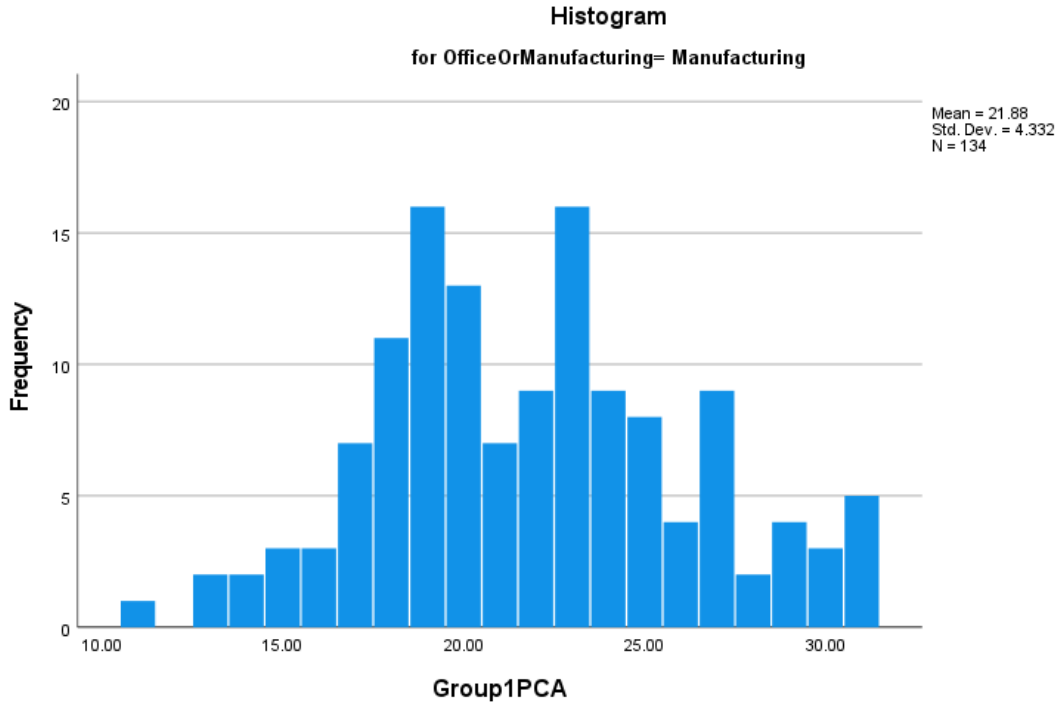
	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group1PCA	Office	.067	120	.200*	.988	120	.379
	Manufacturing	.101	134	.002	.981	134	.058

*. This is a lower bound of the true significance.

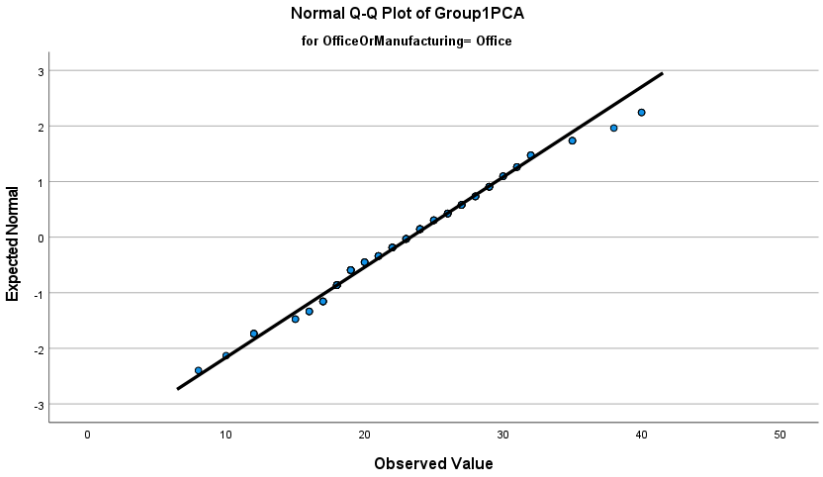
a. Lilliefors Significance Correction

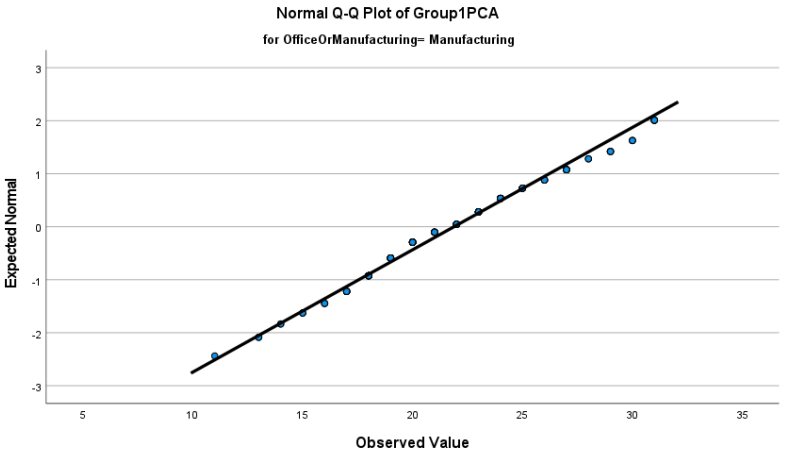
Histograms

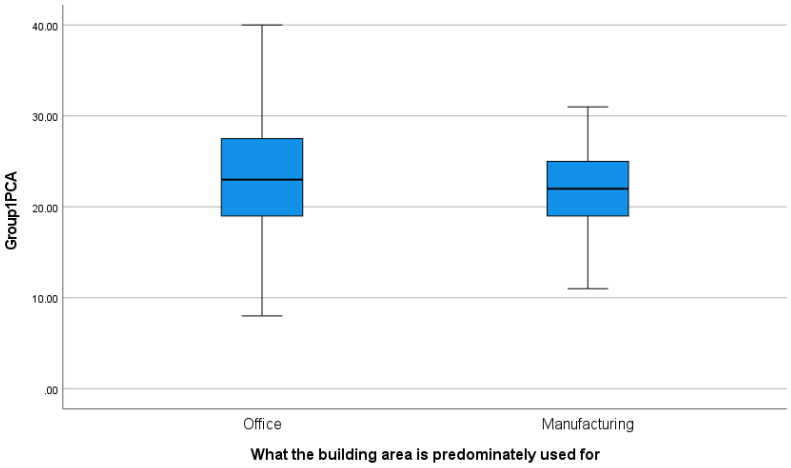




Normal Q-Q Plots







T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group1PCA	Office	120	23.3333	6.16351	.56265
	Manufacturing	134	21.8806	4.33216	.37424

Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means

		F	Sig.	t	df	Significance One-Sided p	Significance Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper
Group1PCA	Equal variances assumed	12.460	<.001	2.191	252	.015	.029	1.45274	.66320	.14662	2.75885
	Equal variances not assumed			2.150	210.689	.016	.033	1.45274	.67574	.12065	2.78482

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval Lower	95% Confidence Interval Upper
Group1PCA	Cohen's d	5.27677	.275	.028	.523
	Hedges' correction	5.29254	.274	.027	.521
	Glass's delta	4.33216	.335	.085	.584

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

No further significant outliers found
Shapiro-wilk test of normality is no longer significant (results are greater than 0.05)
Proceed with reporting independent t-test results

GROUP 2
RUN DESCRIPTIVE ANALYSIS AND T-TEST ON ALL RESULTS EXAMINE VARIABLES=Group2PCA BY OfficeOrManufacturing /PLOT BOXPLOT HISTOGRAM NPPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL. T-TEST GROUPS=OfficeOrManufacturing(1 2) /MISSING=ANALYSIS /VARIABLES=Group2PCA /CRITERIA=CI(.95). RUN DESCRIPTIVE ANALYSIS AND T-TEST EXAMINE VARIABLES=Group1PCA BY OfficeOrManufacturing /PLOT BOXPLOT HISTOGRAM NPPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL. T-TEST GROUPS=OfficeOrManufacturing(1 2) /MISSING=ANALYSIS /VARIABLES=Group1PCA /CRITERIA=CI(.95).

Explore

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases Valid N	Cases Valid Percent	Cases Missing N	Cases Missing Percent	Cases Total N	Cases Total Percent
Group2PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

	What the building area is predominately used for			Statistic	Std. Error
Group2PCA	Office	Mean		13.5917	.23890
		95% Confidence Interval for Mean	Lower Bound	13.1186	
			Upper Bound	14.0647	
		5% Trimmed Mean		13.5833	

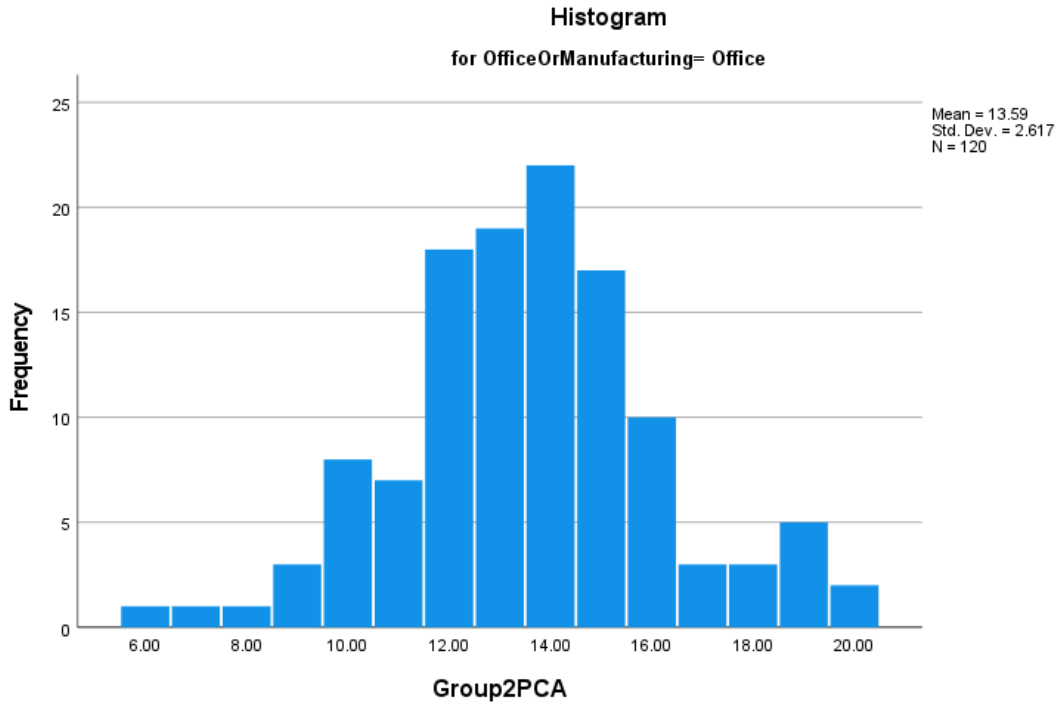
		Median		14.0000	
		Variance		6.849	
		Std. Deviation		2.61700	
		Minimum		6.00	
		Maximum		20.00	
		Range		14.00	
		Interquartile Range		3.00	
		Skewness		.059	.221
		Kurtosis		.480	.438
	Manufacturing	Mean		12.3529	.21555
		95% Confidence Interval for Mean	Lower Bound	11.9266	
			Upper Bound	12.7792	
		5% Trimmed Mean		12.3676	
		Median		13.0000	
		Variance		6.319	
		Std. Deviation		2.51375	
		Minimum		7.00	
		Maximum		19.00	
		Range		12.00	
		Interquartile Range		4.00	
		Skewness		-.101	.208
		Kurtosis		-.242	.413

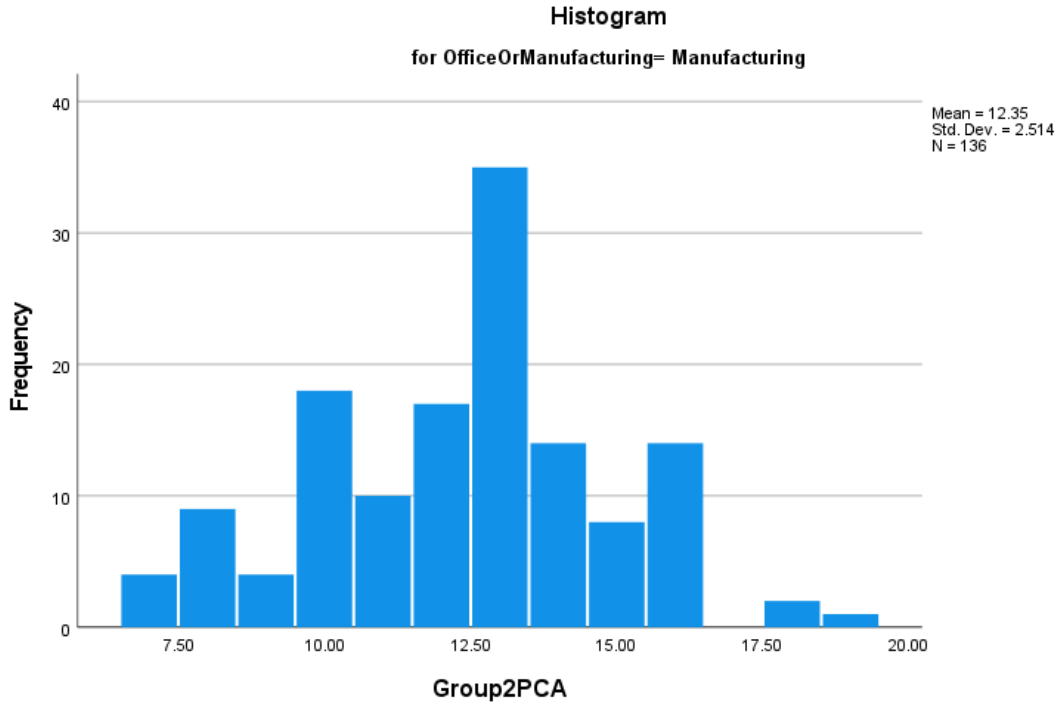
Tests of Normality

	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group2PCA	Office	.105	120	.003	.975	120	.027
	Manufacturing	.146	136	<.001	.967	136	.002

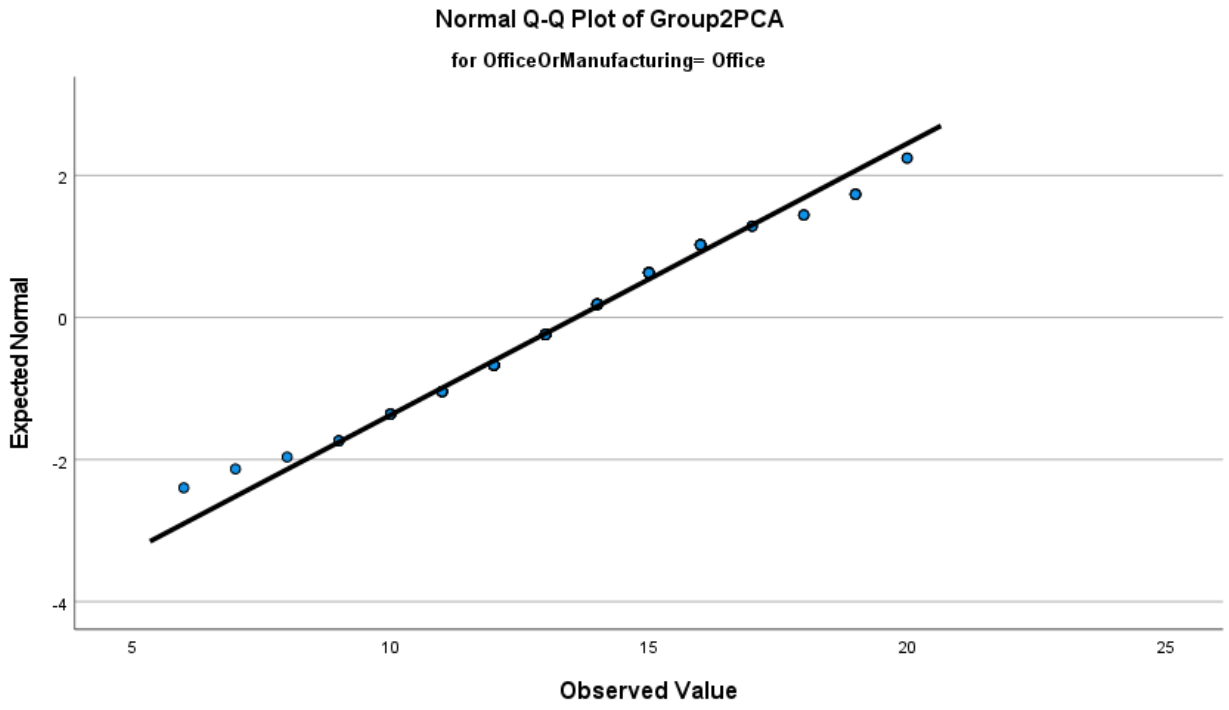
a. Lilliefors Significance Correction

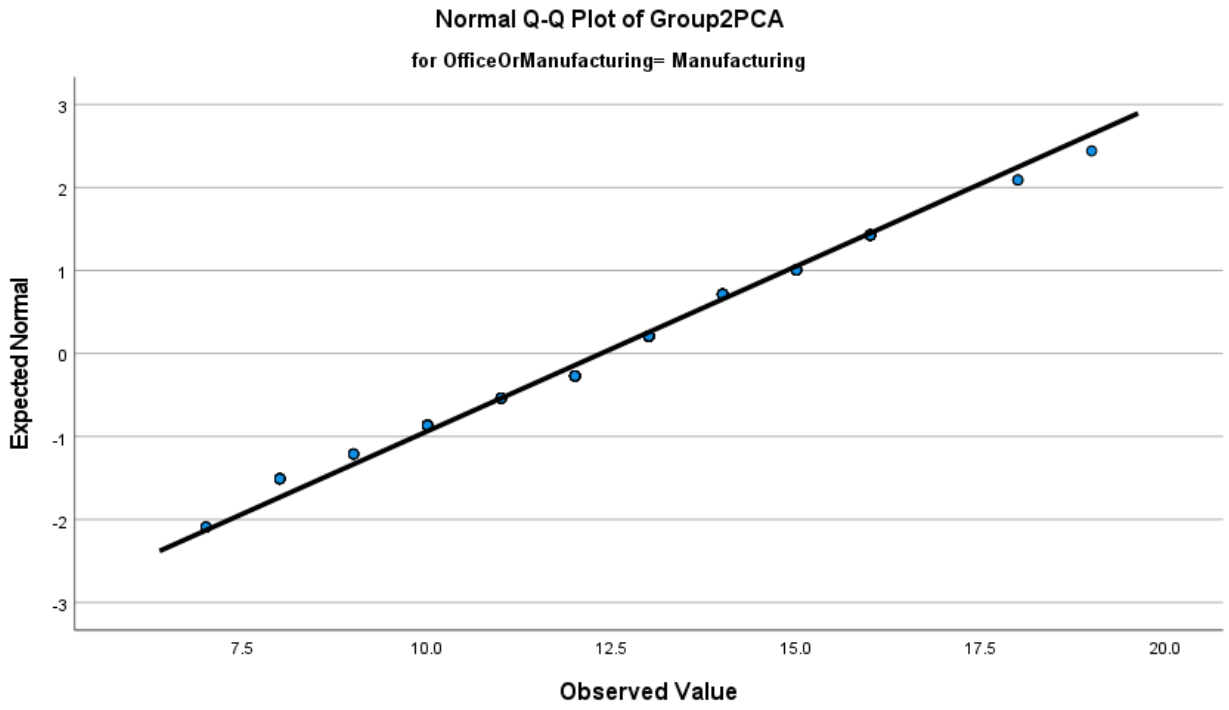
Histograms

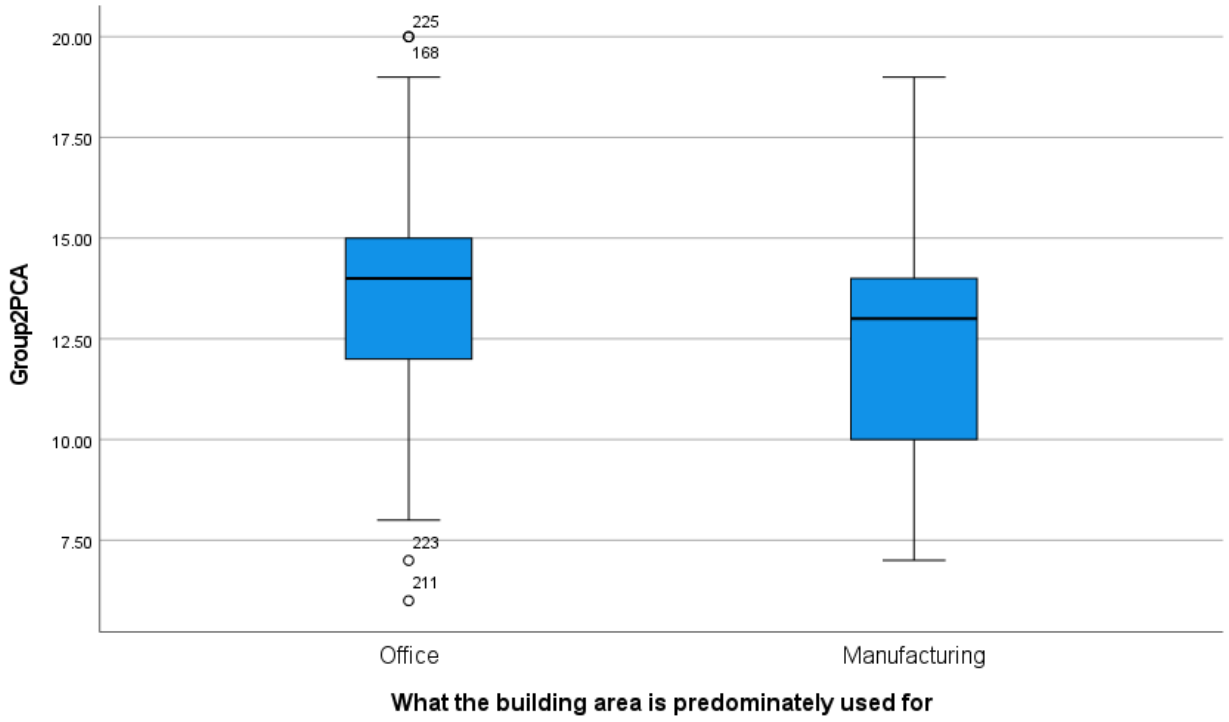




Normal Q-Q Plots


Normal Q-Q Plot of Group2PCA
for OfficeOrManufacturing= Office
Expected Normal
2
0
-2
-4
5
10
15
20
25
Observed Value


Normal Q-Q Plot of Group2PCA
for OfficeOrManufacturing= Manufacturing
Expected Normal
3
2
1
0
-1
-2
-3
7.5
10.0
12.5
15.0
17.5
20.0
Observed Value



T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group2PCA	Office	120	13.5917	2.61700	.23890
	Manufacturing	136	12.3529	2.51375	.21555

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group2PCA	Equal variances assumed	.001	.972	3.859	254	<.001	<.001	1.23873	.32096	.60665	1.87080
	Equal variances not assumed			3.850	247.205	<.001	<.001	1.23873	.32177	.60497	1.87248

Independent Samples Effect Sizes

	Standardizer[a]	Point Estimate	95% Confidence Interval	
			Lower	Upper

Group2PCA	Cohen's d	2.56264	.483	.234	.732
	Hedges' correction	2.57024	.482	.233	.730
	Glass's delta	2.51375	.493	.240	.744

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

several outliers identified - 225, 168, 223, 211 Remove these and re-run test
EXAMINE VARIABLES=Group2PCA BY OfficeOrManufacturing /PLOT BOXPLOT HISTOGRAM NPPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL. T-TEST GROUPS=OfficeOrManufacturing(1 2) /MISSING=ANALYSIS /VARIABLES=Group2PCA /CRITERIA=CI(.95).

Explore

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Perce
Group2PCA	Office	116	100.0%	0	0.0%	116	1
	Manufacturing	136	100.0%	0	0.0%	136	1

Descriptives

	What the building area is predominately used for			Statistic	Std. Error
Group2PCA	Office	Mean		13.6034	.21762
		95% Confidence Interval for Mean	Lower Bound	13.1724	
			Upper Bound	14.0345	
		5% Trimmed Mean		13.5594	
		Median		14.0000	
		Variance		5.494	
		Std. Deviation		2.34383	
		Minimum		8.00	
		Maximum		19.00	
		Range		11.00	
		Interquartile Range		3.00	
		Skewness		.205	.225
		Kurtosis		.041	.446
	Manufacturing	Mean		12.3529	.21555
		95% Confidence Interval for Mean	Lower Bound	11.9266	
			Upper Bound	12.7792	
		5% Trimmed Mean		12.3676	
		Median		13.0000	
		Variance		6.319	
		Std. Deviation		2.51375	
		Minimum		7.00	
		Maximum		19.00	
		Range		12.00	

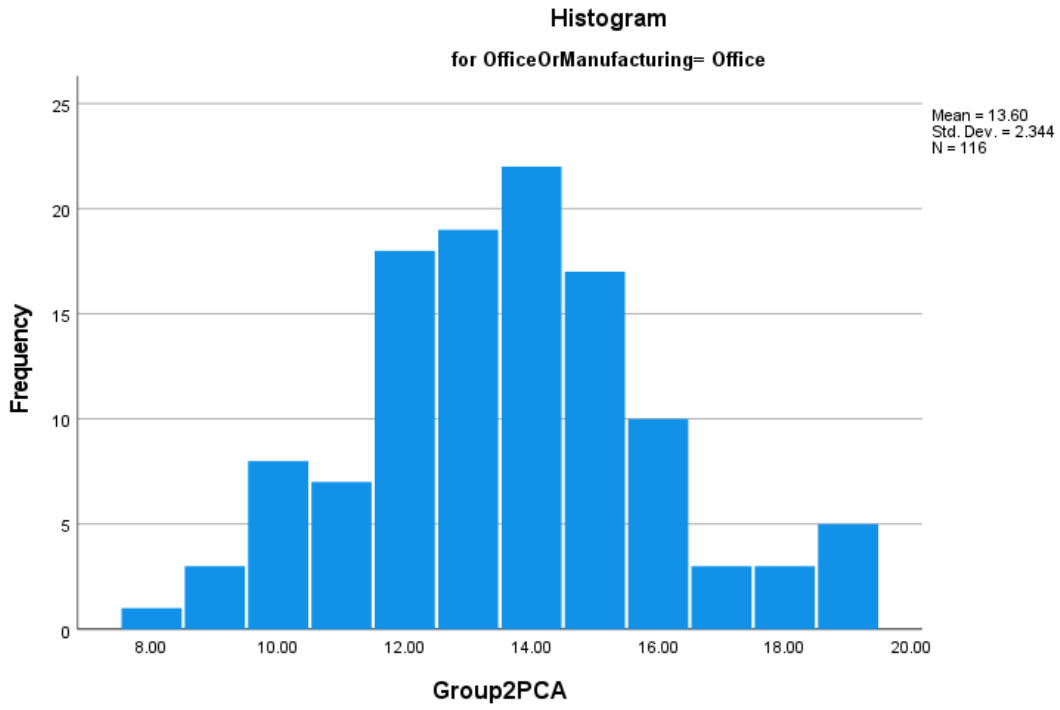
	Interquartile Range	4.00	
	Skewness	-.101	.208
	Kurtosis	-.242	.413

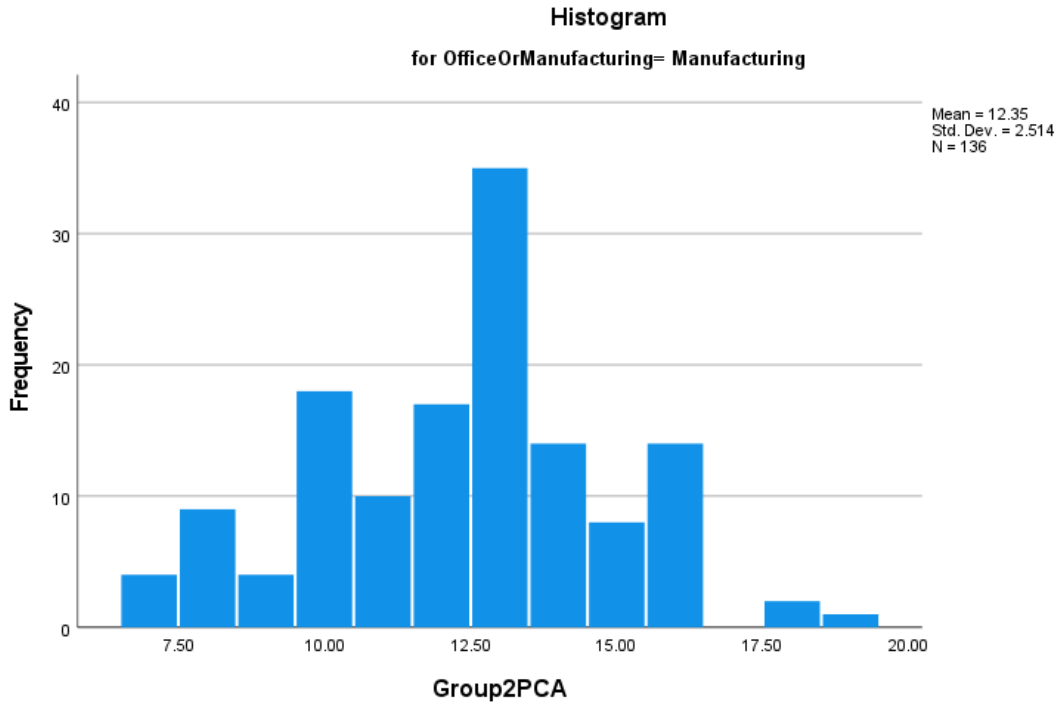
Tests of Normality

	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group2PCA	Office	.105	116	.003	.972	116	.016
	Manufacturing	.146	136	<.001	.967	136	.002

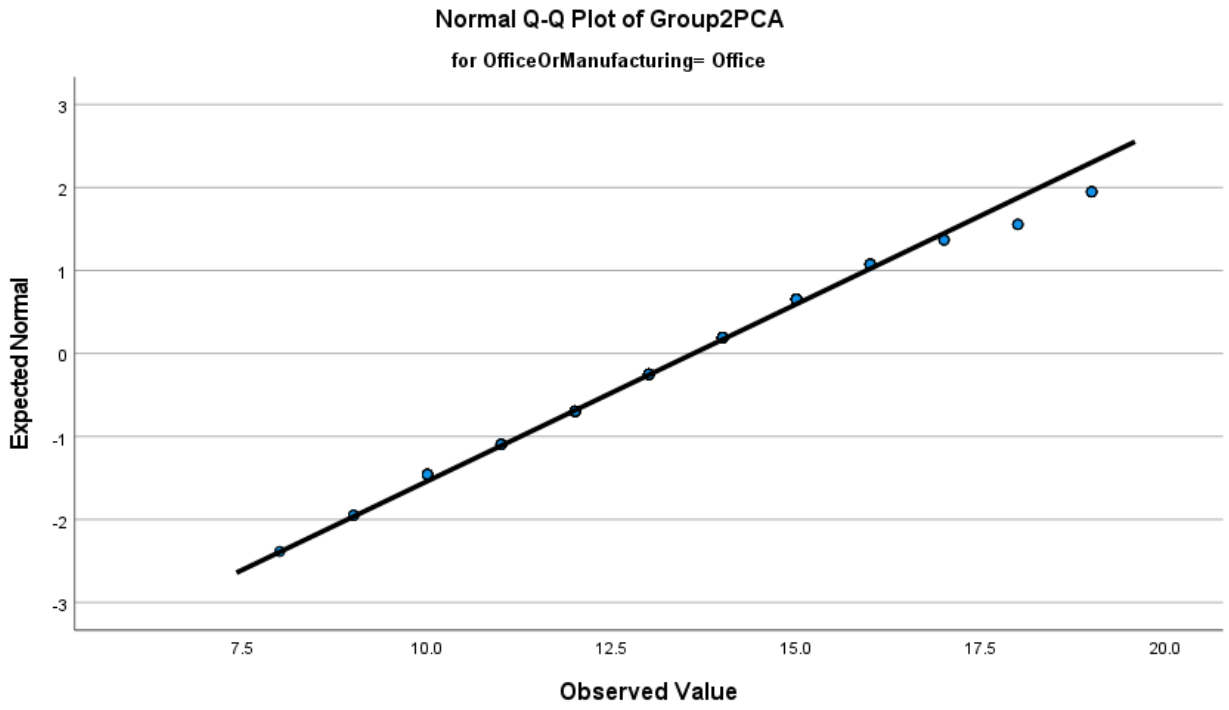
a. Lilliefors Significance Correction

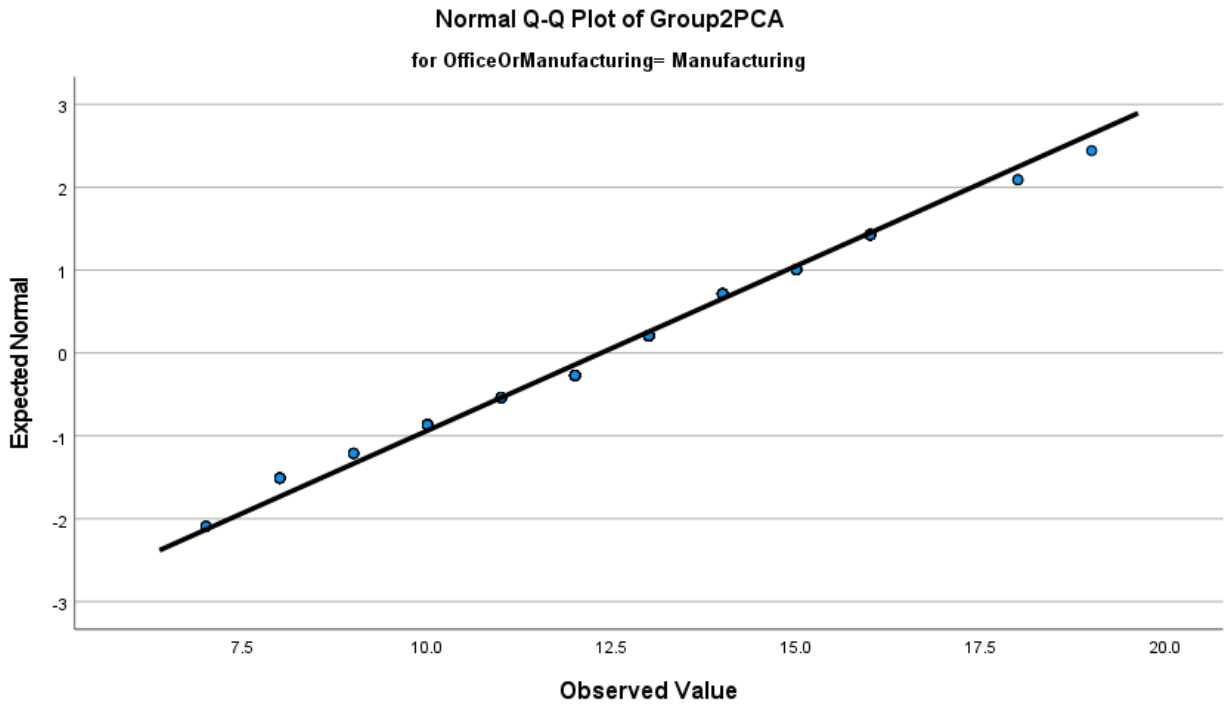
Histograms

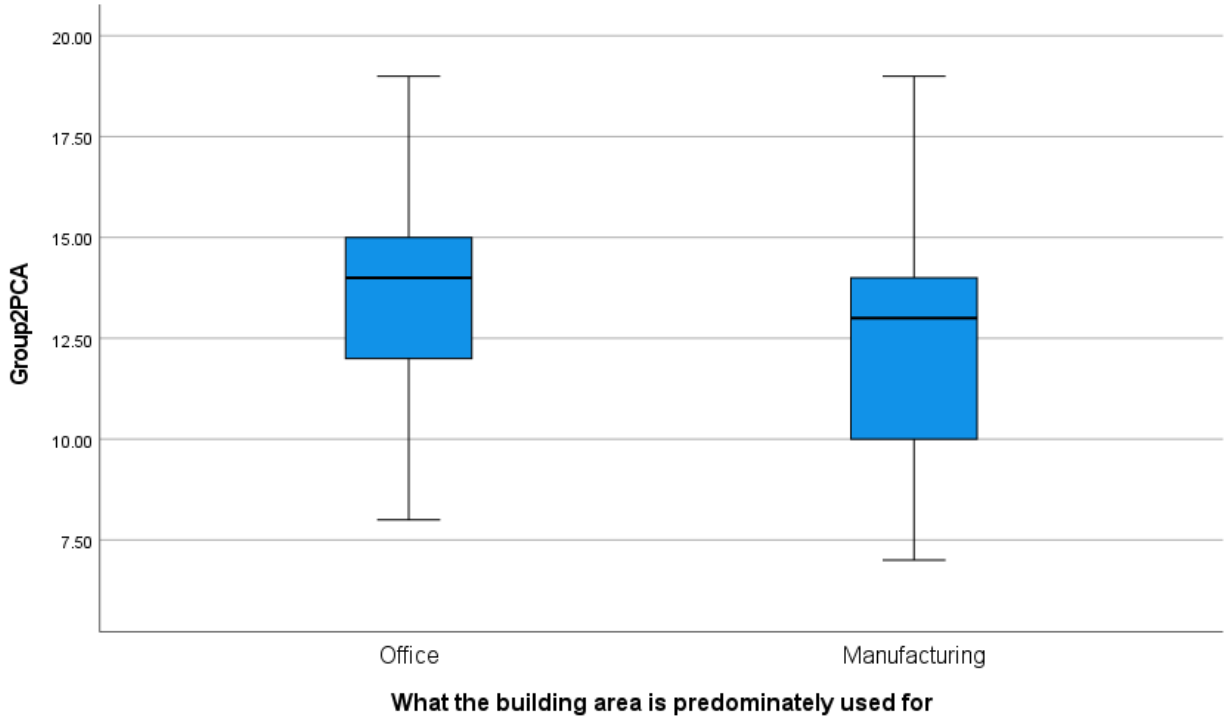




Normal Q-Q Plots







Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group2PCA	Office	116	13.6034	2.34383	.21762
	Manufacturing	136	12.3529	2.51375	.21555

Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means

						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group2PCA	Equal variances assumed	.703	.402	4.060	250	<.001	<.001	1.25051	.30801	.64388	1.85714
	Equal variances not assumed			4.083	247.999	<.001	<.001	1.25051	.30630	.64722	1.85379

Independent Samples Effect Sizes

				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Group2PCA	Cohen's d	2.43706	.513	.261	.764
	Hedges' correction	2.44440	.512	.260	.762
	Glass's delta	2.51375	.497	.242	.751

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

There are no longer any outliers in the dataset.
The Shapirp-Wilk test is significant for both groups, which highlights that the data is not normally distributed. This is confirmed by the box and whisker plots and Q-Q plot
Inappropriate to conduct independent t-test on this, purse alternative such as mann-whitney test

Group 3
Conduct descriptives and t-test as above
What the building area is predominately used for

Case Processing Summary

		Cases					
	What the building area is predominately used for	Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group3PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

	What the building area is predominately used for		Statistic	Std. Error
Group3PCA	Office	Mean	20.8000	.25066
		95% Confidence Interval for Mean — Lower Bound	20.3037	
		95% Confidence Interval for Mean — Upper Bound	21.2963	
		5% Trimmed Mean	20.8981	
		Median	20.0000	
		Variance	7.539	
		Std. Deviation	2.74581	
		Minimum	11.00	
		Maximum	25.00	
		Range	14.00	
		Interquartile Range	4.00	
		Skewness	-.362	.221

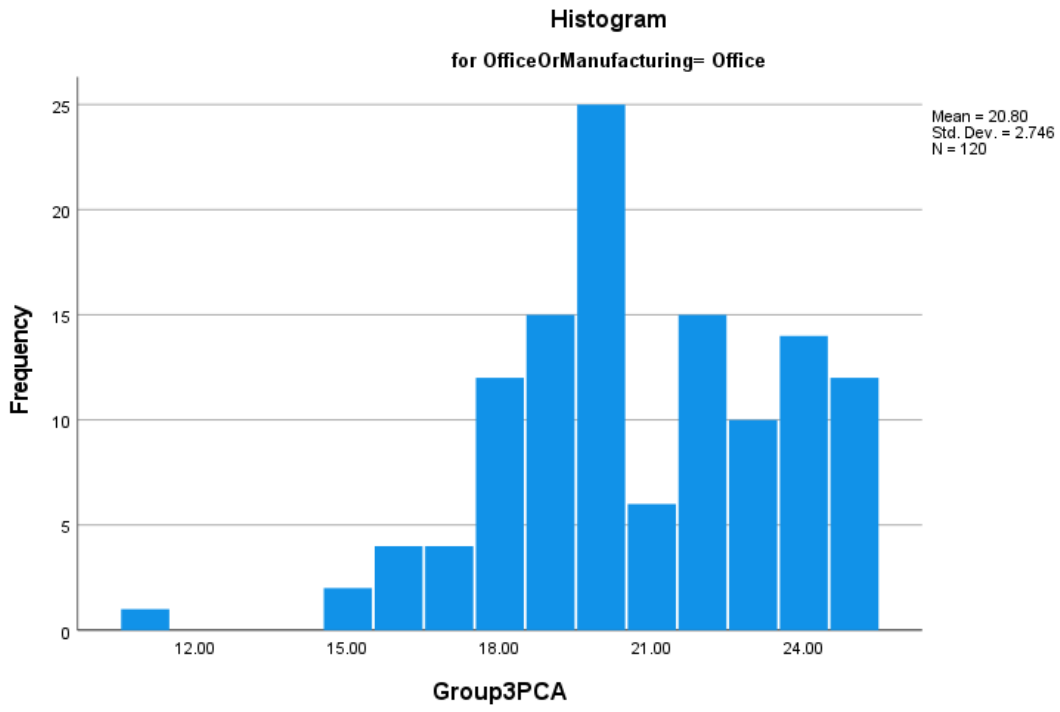
		Kurtosis		.159	.438
	Manufacturing	Mean		20.3015	.21090
		95% Confidence Interval for Mean	Lower Bound	19.8844	
			Upper Bound	20.7186	
		5% Trimmed Mean		20.3693	
		Median		20.0000	
		Variance		6.049	
		Std. Deviation		2.45951	
		Minimum		10.00	
		Maximum		25.00	
		Range		15.00	
		Interquartile Range		3.00	
		Skewness		-.476	.208
		Kurtosis		1.672	.413

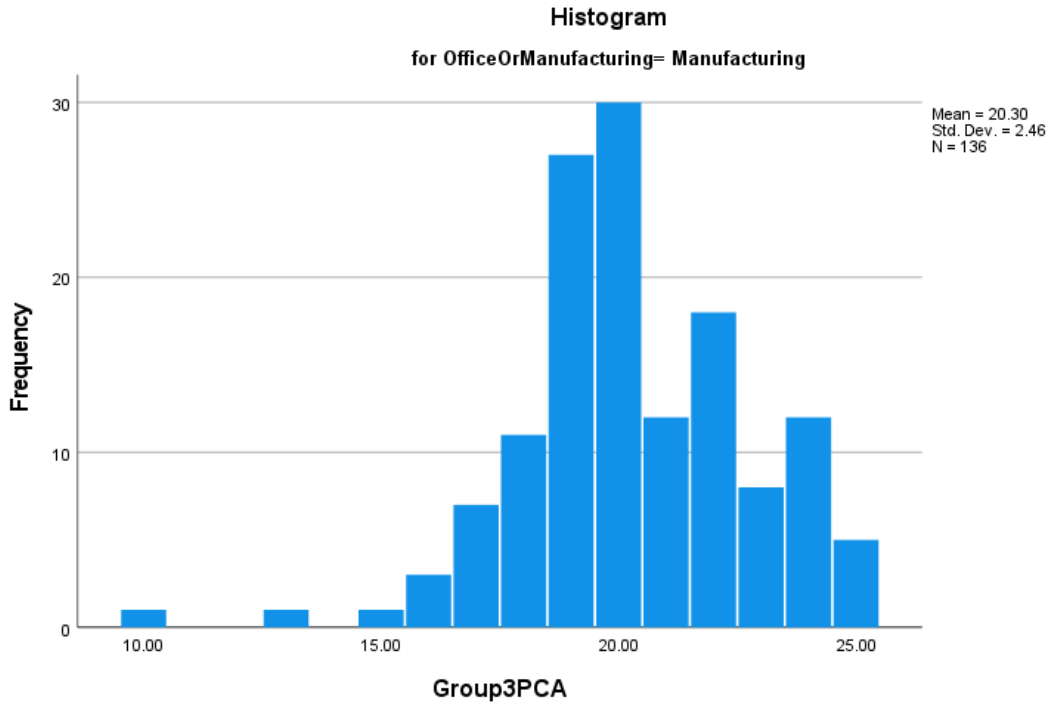
Tests of Normality

	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group3PCA	Office	.140	120	<.001	.952	120	<.001
	Manufacturing	.144	136	<.001	.949	136	<.001

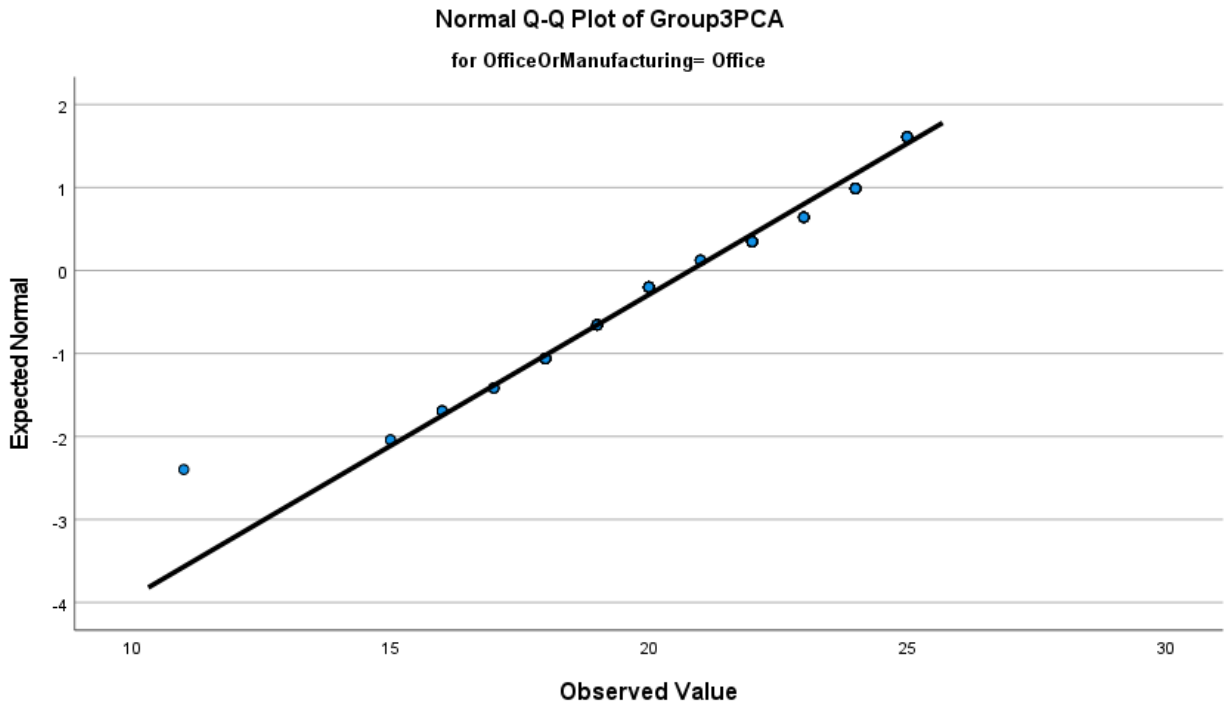
a. Lilliefors Significance Correction

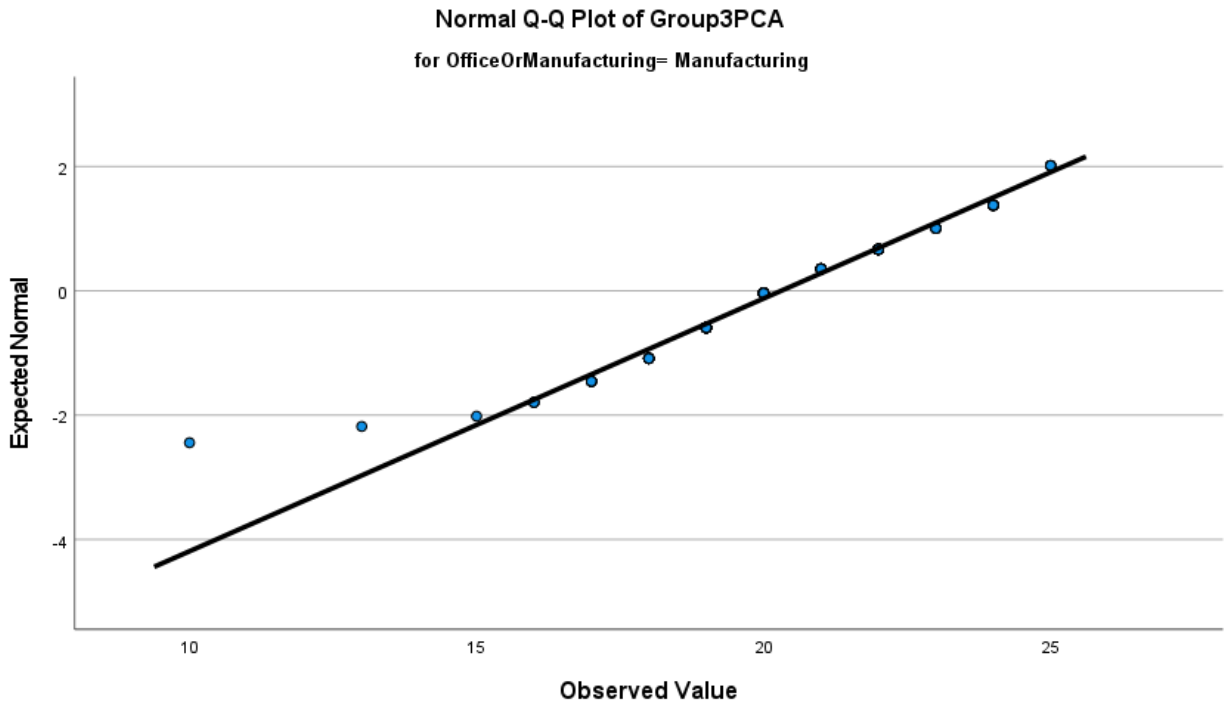
Histograms

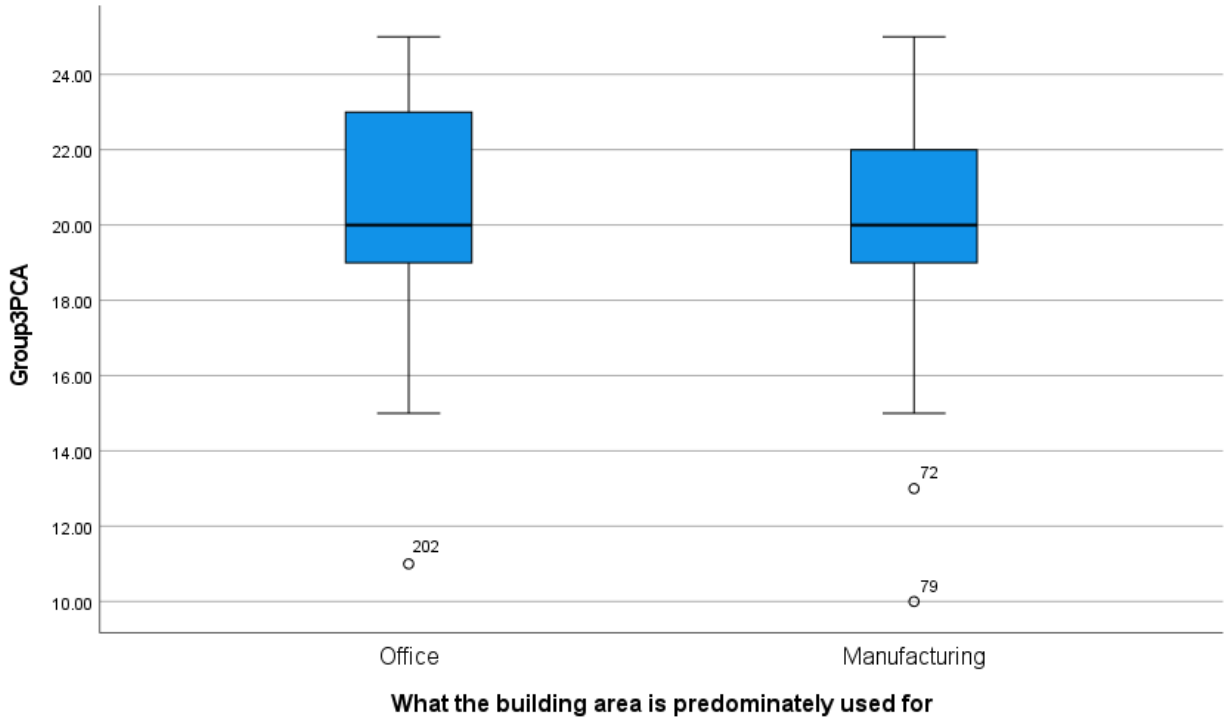




Normal Q-Q Plots







Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group3PCA	Office	120	20.8000	2.74581	.25066
	Manufacturing	136	20.3015	2.45951	.21090

Independent Samples Test

Levene's Test for Equality of Variances	t-test for Equality of Means

		F	Sig.	t	df	Significance One-Sided p	Significance Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper
Group3PCA	Equal variances assumed	3.940	.048	1.532	254	.063	.127	.49853	.32533	-.14216	1.13922
	Equal variances not assumed			1.522	240.765	.065	.129	.49853	.32758	-.14676	1.14382

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval Lower	95% Confidence Interval Upper
Group3PCA	Cohen's d	2.59758	.192	-.054	.438
	Hedges' correction	2.60528	.191	-.054	.436
	Glass's delta	2.45951	.203	-.044	.449

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

Analysis identifies the following outliers 72, 79 and 202

Remove these and re-run analysis

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases Valid N	Cases Valid Percent	Cases Missing N	Cases Missing Percent	Cases Total N	Cases Total Percent
Group3PCA	Office	119	100.0%	0	0.0%	119	100.0%
	Manufacturing	134	100.0%	0	0.0%	134	100.0%

Descriptives

	What the building area is predominately used for			Statistic	Std. Error
Group3PCA	Office	Mean		20.8824	.23874
		95% Confidence Interval for Mean	Lower Bound	20.4096	
			Upper Bound	21.3551	
		5% Trimmed Mean		20.9435	
		Median		20.0000	
		Variance		6.783	
		Std. Deviation		2.60435	
		Minimum		15.00	
		Maximum		25.00	
		Range		10.00	
		Interquartile Range		4.00	

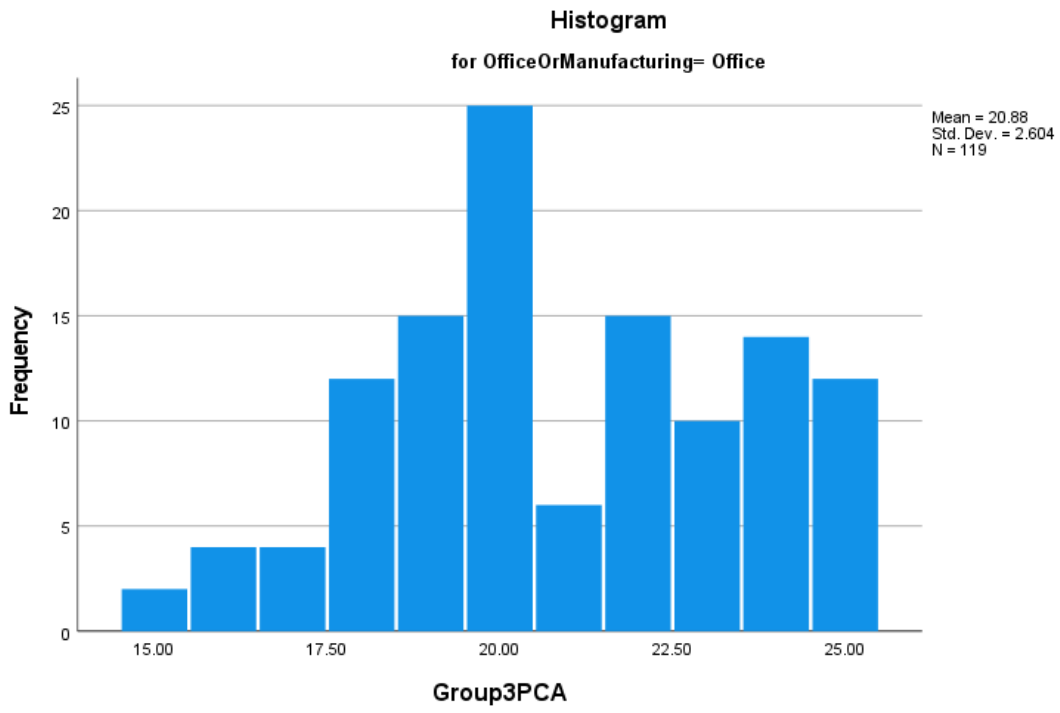
		Skewness		-.065	.222
		Kurtosis		-.829	.440
	Manufacturing	Mean		20.4328	.19169
		95% Confidence Interval for Mean	Lower Bound	20.0537	
			Upper Bound	20.8120	
		5% Trimmed Mean		20.4254	
		Median		20.0000	
		Variance		4.924	
		Std. Deviation		2.21901	
		Minimum		15.00	
		Maximum		25.00	
		Range		10.00	
		Interquartile Range		3.00	
		Skewness		.198	.209
		Kurtosis		-.448	.416

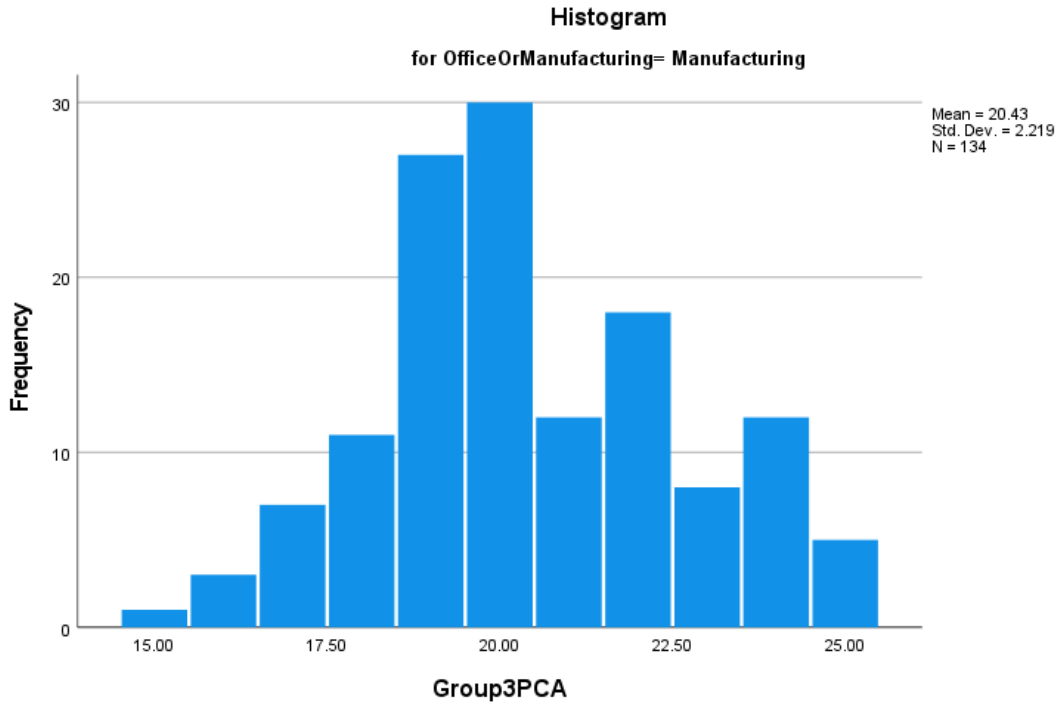
Tests of Normality

	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Group3PCA	Office	.154	119	<.001	.953	119	<.001
	Manufacturing	.167	134	<.001	.962	134	<.001

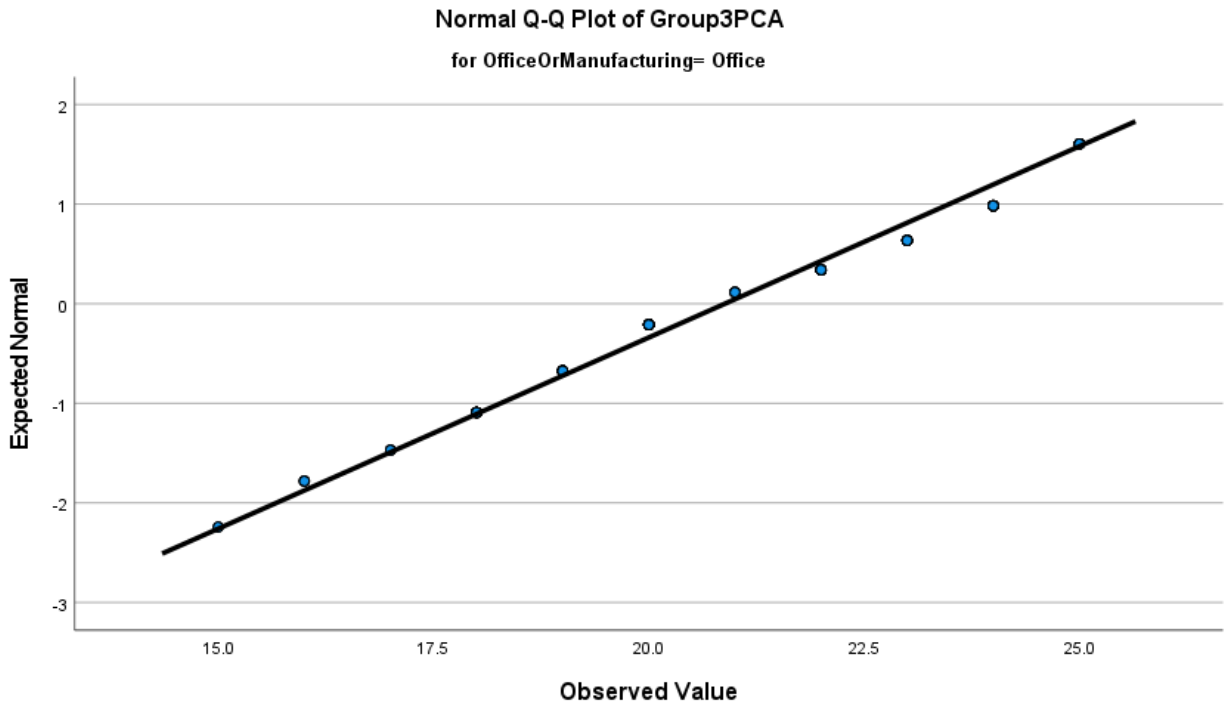
a. Lilliefors Significance Correction

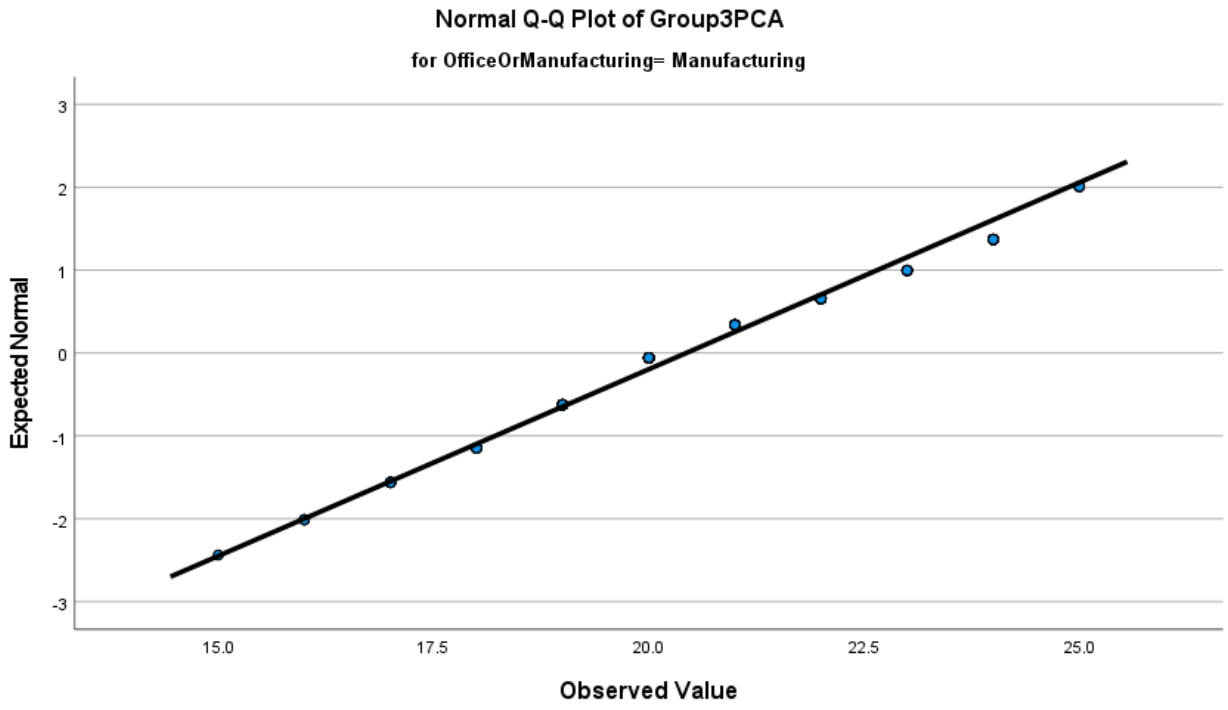
Histograms

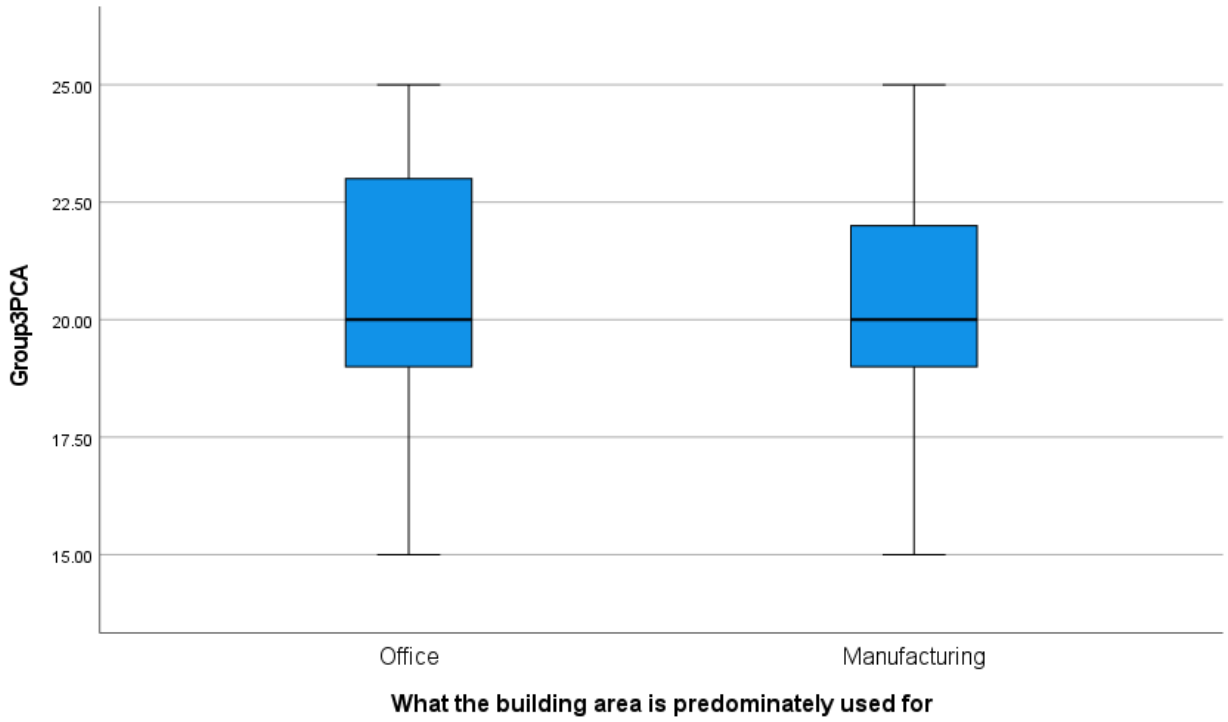




Normal Q-Q Plots







T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group3PCA	Office	119	20.8824	2.60435	.23874
	Manufacturing	134	20.4328	2.21901	.19169

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group3PCA	Equal variances assumed	5.973	.015	1.482	251	.070	.140	.44952	.30330	-.14781	1.04685
	Equal variances not assumed			1.468	233.200	.072	.143	.44952	.30618	-.15371	1.05274

Independent Samples Effect Sizes

				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Group3PCA	Cohen's d	2.40786	.187	-.061	.434
	Hedges' correction	2.41509	.186	-.061	.433
	Glass's delta	2.21901	.203	-.046	.450

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

There are no longer any outliers in the data
Shapiro-wilk is significant which suggests data is not normally distributed, confirmed by box and whiskerplots and q-q plots.
Not appropriate to undertake independent t-test, explore other options such as mann-whitney test

GROUP 4

Explore

What the building area is predominately used for

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	What the building area is predominately used for	N	Percent	N	Percent	N	Percent
Group4PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

What the building area is predominately used for				Statistic	Std. Error
Group4PCA	Office	Mean		21.9250	.35821
		95% Confidence Interval for Mean	Lower Bound	21.2157	
			Upper Bound	22.6343	
		5% Trimmed Mean		22.0463	
		Median		22.0000	
		Variance		15.398	

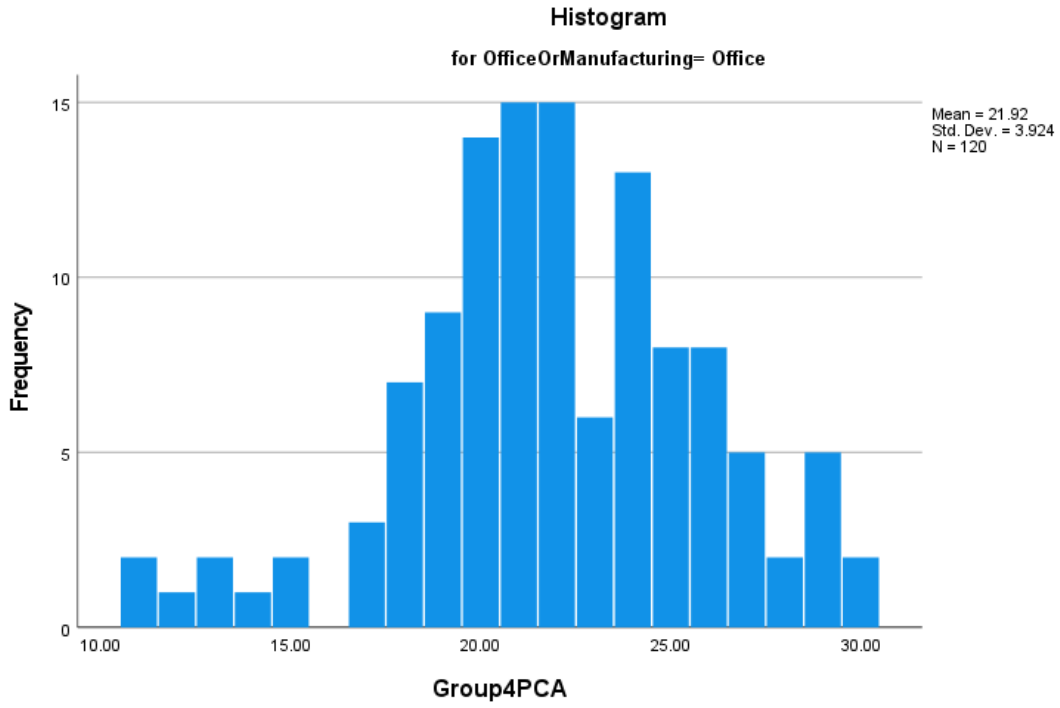
		Std. Deviation		3.92399	
		Minimum		11.00	
		Maximum		30.00	
		Range		19.00	
		Interquartile Range		4.75	
		Skewness		-.349	.221
		Kurtosis		.425	.438
	Manufacturing	Mean		22.0588	.33768
		95% Confidence Interval for Mean	Lower Bound	21.3910	
			Upper Bound	22.7266	
		5% Trimmed Mean		22.1373	
		Median		22.0000	
		Variance		15.508	
		Std. Deviation		3.93797	
		Minimum		12.00	
		Maximum		30.00	
		Range		18.00	
		Interquartile Range		6.00	
		Skewness		-.300	.208
		Kurtosis		-.416	.413

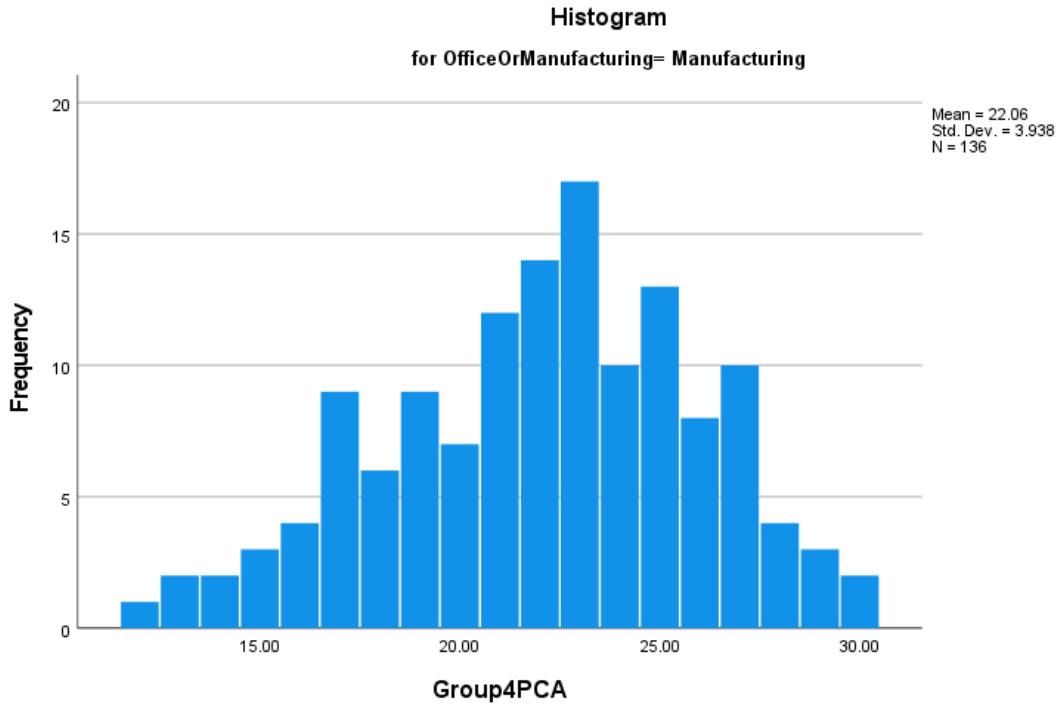
Tests of Normality

	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group4PCA	Office	.087	120	.027	.973	120	.018
	Manufacturing	.090	136	.009	.981	136	.057

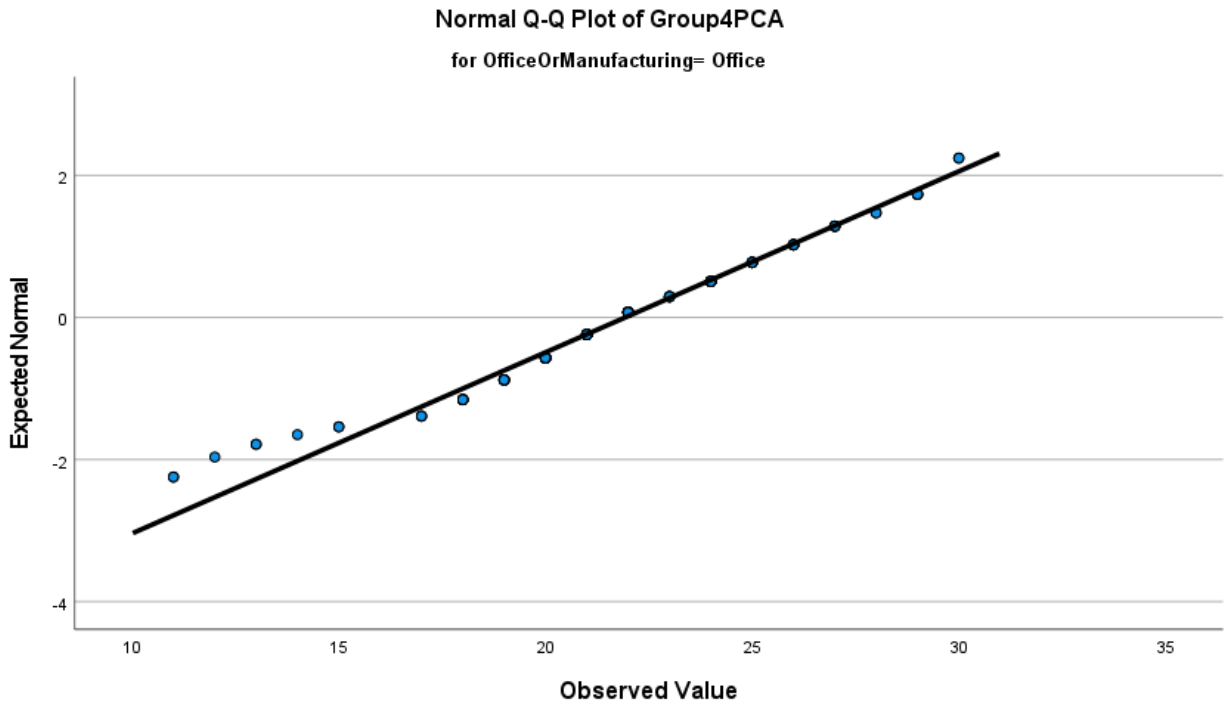
a. Lilliefors Significance Correction

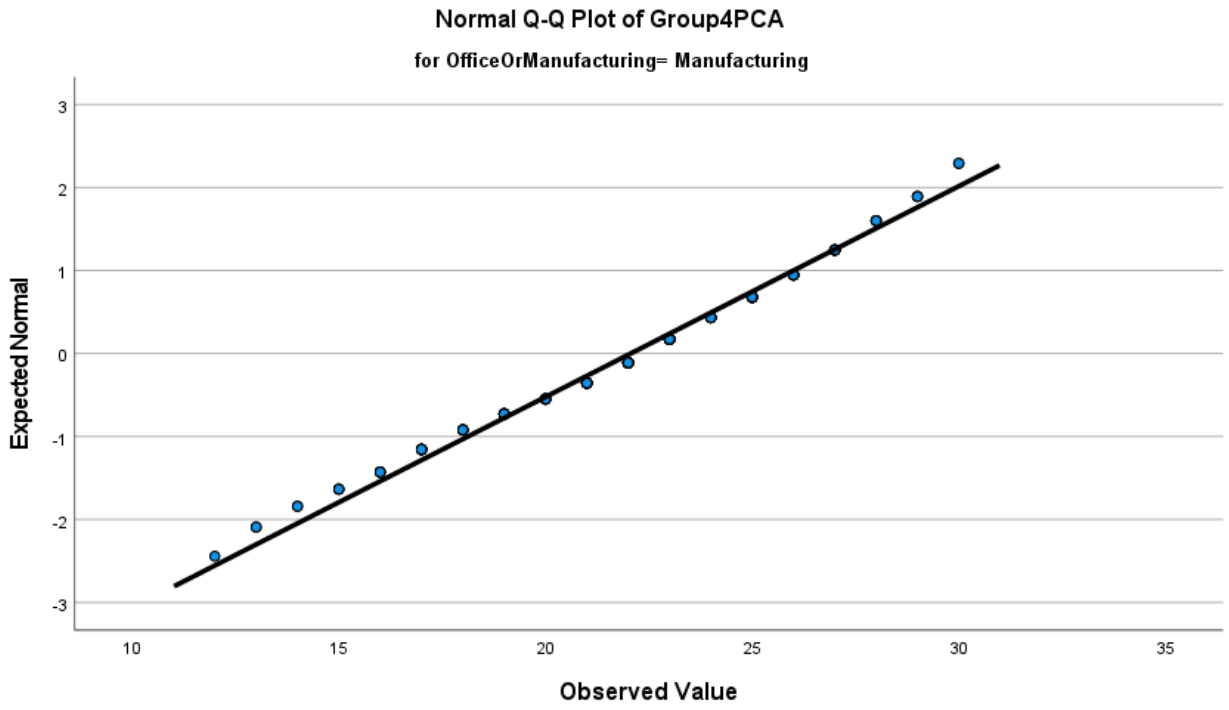
Group4PCA
Histograms





Normal Q-Q Plots


Normal Q-Q Plot of Group4PCA
for OfficeOrManufacturing= Office
Expected Normal
2
0
-2
-4
10
15
20
25
30
35
Observed Value


Normal Q-Q Plot of Group4PCA
for OfficeOrManufacturing= Manufacturing
Expected Normal
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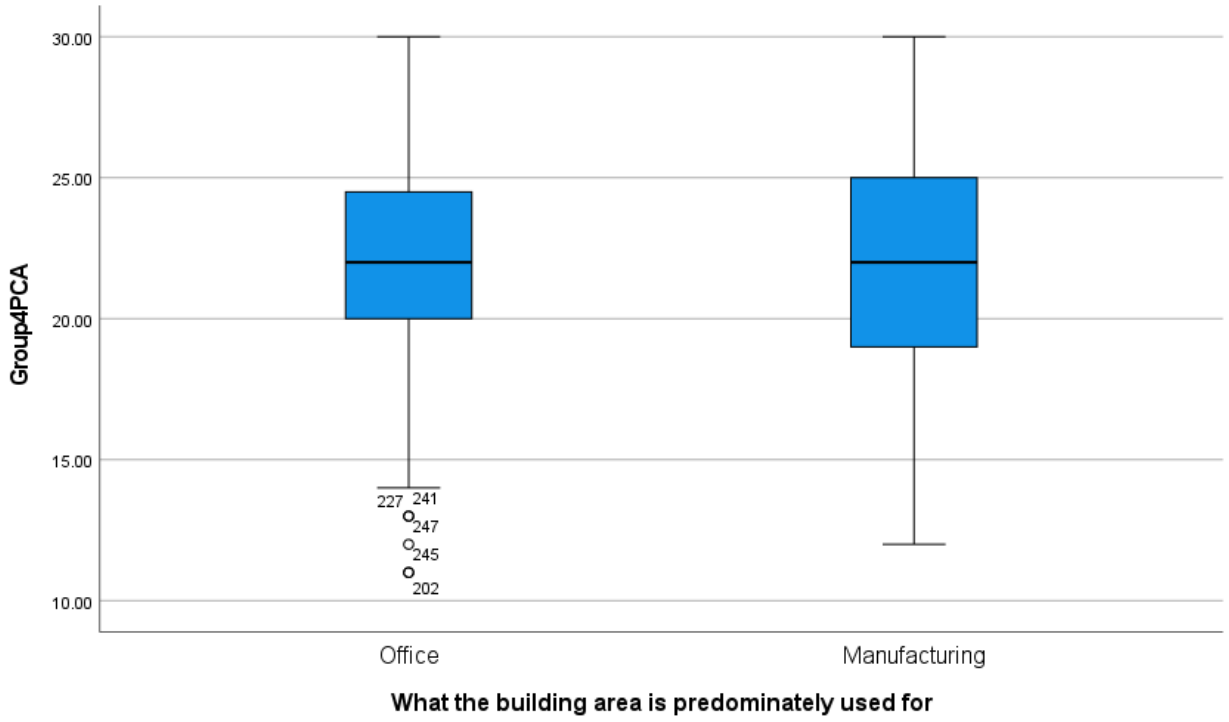
2
1
0
-1
-2
-3
10
15
20
25
30
35
Observed Value



T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group4PCA	Office	120	21.9250	3.92399	.35821
	Manufacturing	136	22.0588	3.93797	.33768

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group4PCA	Equal variances assumed	.245	.621	-.272	254	.393	.786	-.13382	.49239	-1.10351	.83587
	Equal variances not assumed			-.272	250.263	.393	.786	-.13382	.49228	-1.10337	.83572

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Group4PCA	Cohen's d	3.93143	-.034	-.279	.211
	Hedges' correction	3.94308	-.034	-.279	.211
	Glass's delta	3.93797	-.034	-.279	.212

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

several outliers identified - 247, 245, 241, 227, 202
Remove these and re-run descriptive and t-test

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group4PCA	Office	115	100.0%	0	0.0%	115	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

What the building area is predominately used for				Statistic	Std. Error
Group4PCA	Office	Mean		22.3565	.31664
		95% Confidence Interval for Mean	Lower Bound	21.7293	
			Upper Bound	22.9838	
		5% Trimmed Mean		22.3333	
		Median		22.0000	
		Variance		11.530	
		Std. Deviation		3.39554	
		Minimum		14.00	
		Maximum		30.00	
		Range		16.00	
		Interquartile Range		5.00	
		Skewness		.190	.226
		Kurtosis		-.287	.447
	Manufacturing	Mean		22.0588	.33768
		95% Confidence Interval for Mean	Lower Bound	21.3910	
			Upper Bound	22.7266	
		5% Trimmed Mean		22.1373	
		Median		22.0000	
		Variance		15.508	
		Std. Deviation		3.93797	
		Minimum		12.00	
		Maximum		30.00	
		Range		18.00	
		Interquartile Range		6.00	
		Skewness		-.300	.208
		Kurtosis		-.416	.413

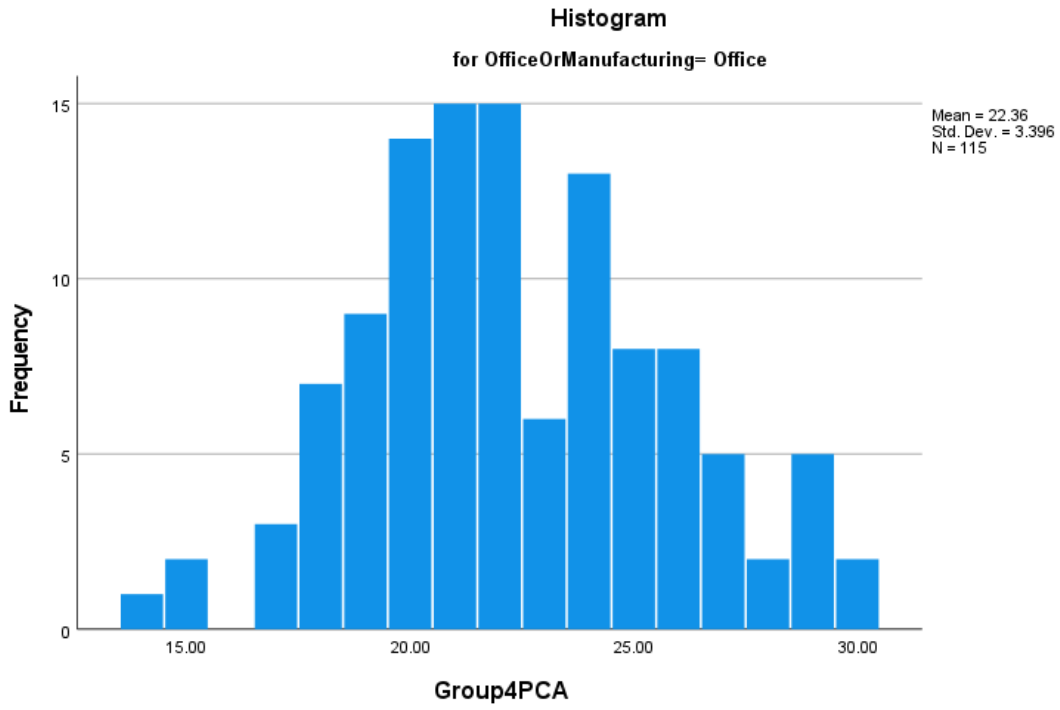
Tests of Normality

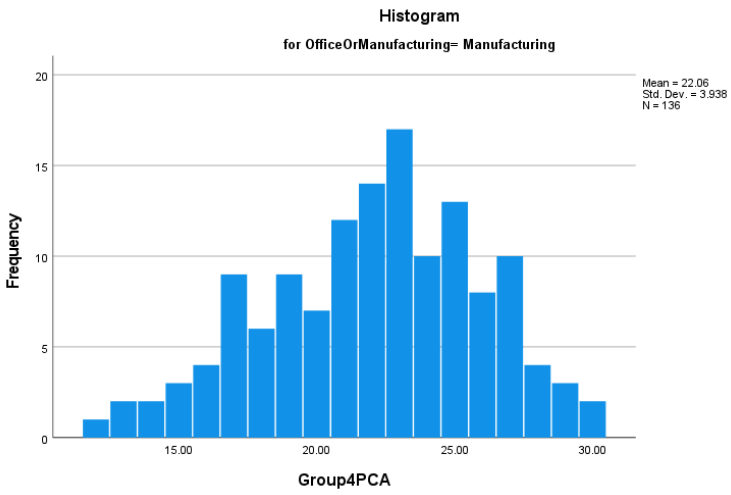
	What the building area is predominately used for	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Group4PCA	Office	.116	115	<.001	.980	115	.083
	Manufacturing	.090	136	.009	.981	136	.057

a. Lilliefors Significance Correction

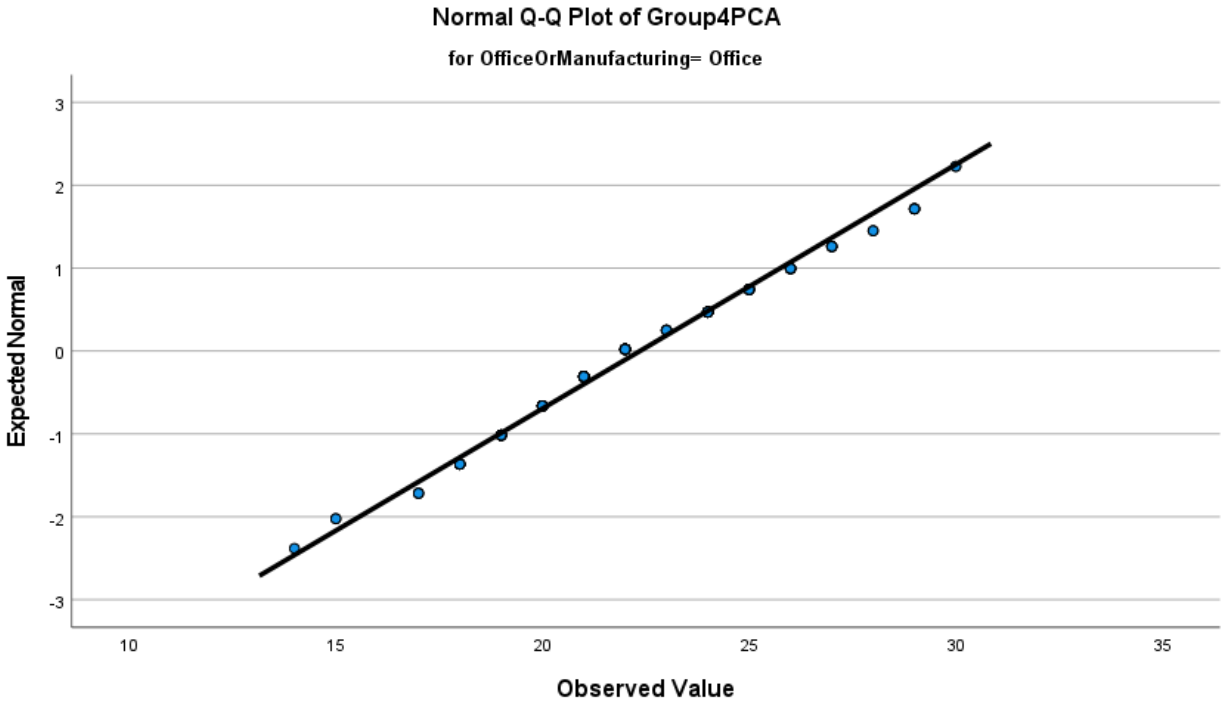
Group4PCA

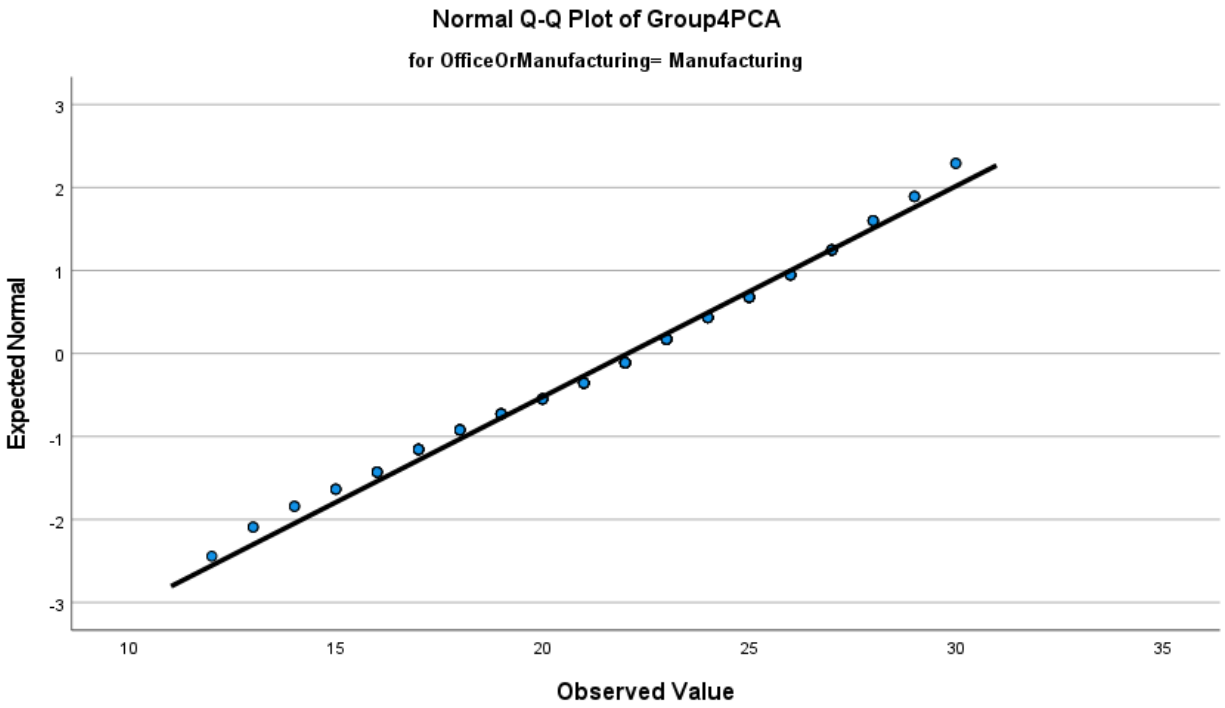
Histograms

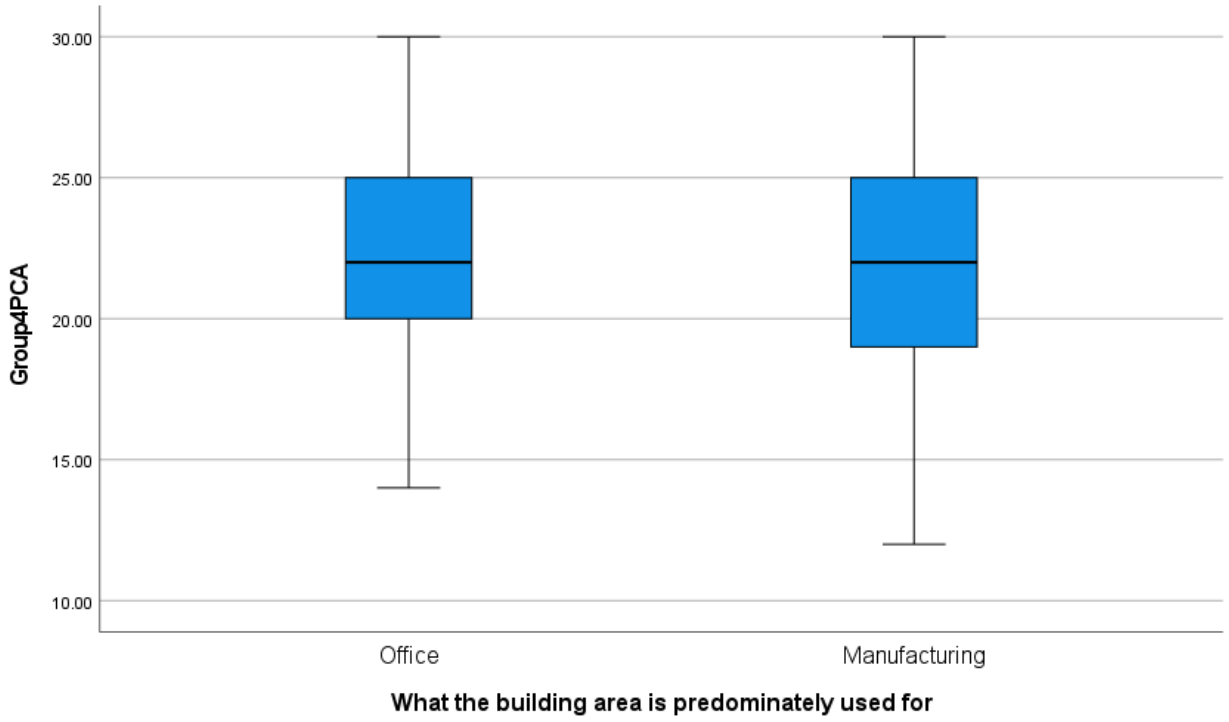




Normal Q-Q Plots


Normal Q-Q Plot of Group4PCA
for OfficeOrManufacturing= Office
Expected Normal
3
2
1
0
-1
-2
-3
10
15
20
25
30
35
Observed Value


Normal Q-Q Plot of Group4PCA
for OfficeOrManufacturing= Manufacturing
Expected Normal
3
2
1
0
-1
-2
-3
10
15
20
25
30
35
Observed Value



T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group4PCA	Office	115	22.3565	3.39554	.31664
	Manufacturing	136	22.0588	3.93797	.33768

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group4PCA	Equal variances assumed	2.175	.142	.635	249	.263	.526	.29770	.46867	-.62536	1.22075
	Equal variances not assumed			.643	248.899	.260	.521	.29770	.46291	-.61402	1.20942

ndependent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Group4PCA	Cohen's d	3.69951	.080	-.168	.329
	Hedges' correction	3.71070	.080	-.167	.328
	Glass's delta	3.93797	.076	-.173	.324

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

No further significant outliers found
Shapiro-wilk test of normality is not longer significant (results are greater than 0.05)
Proceed with reporting independent t-test results

GROUP 5
Descriptive and t-test (similar to above but for group 5)

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group5PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

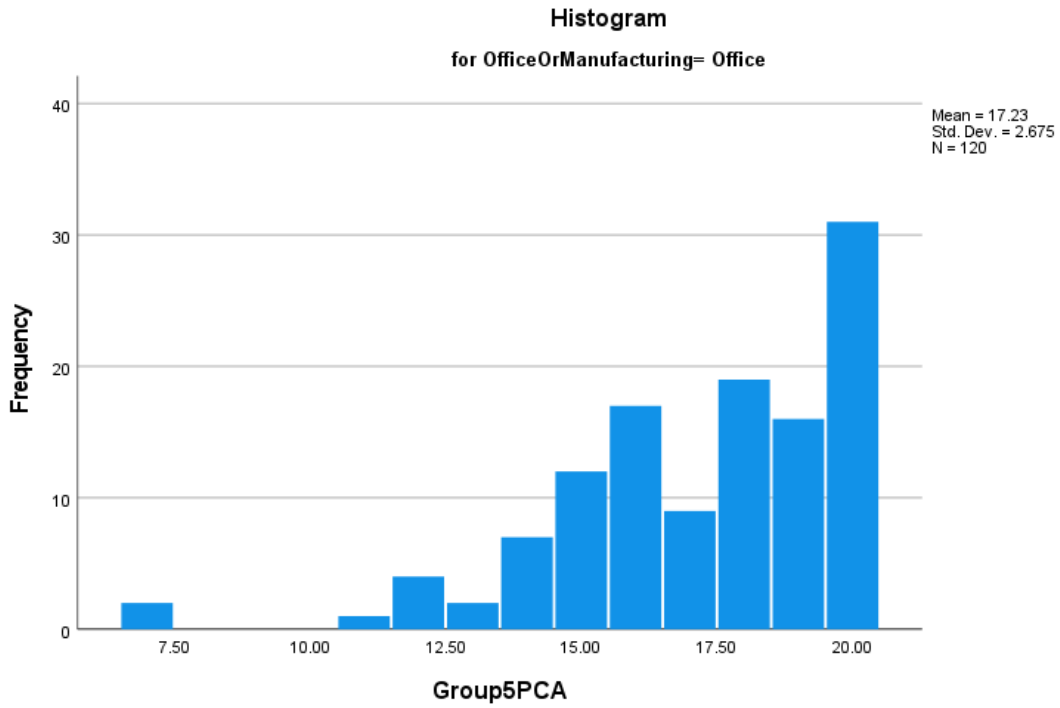
Descriptives

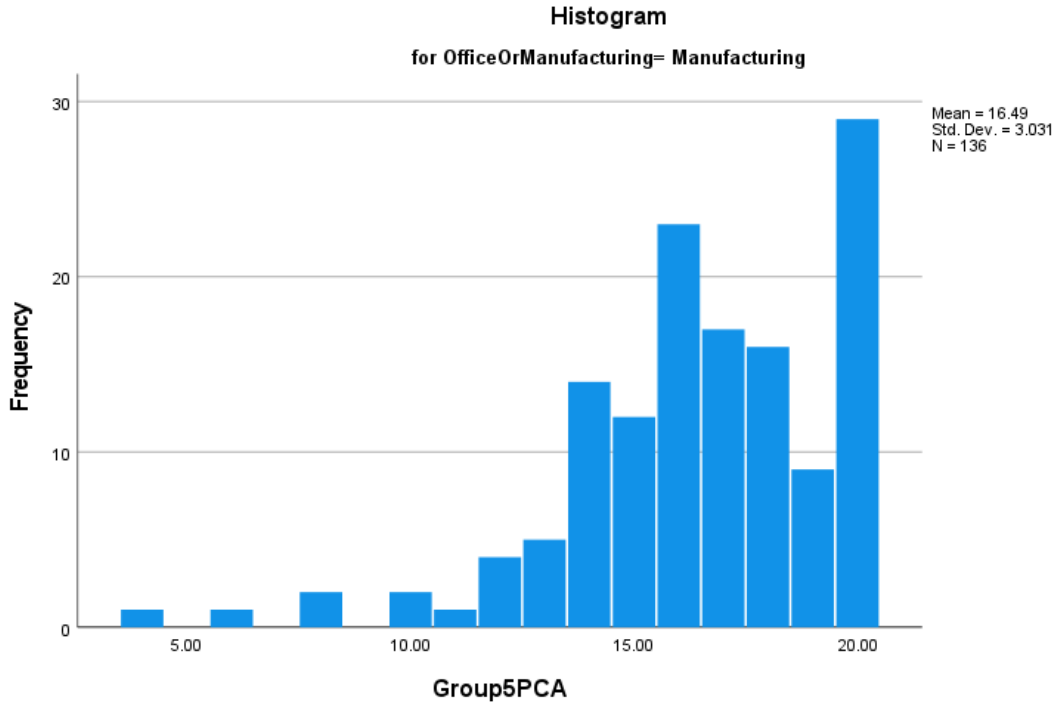
	What the building area is predominately used for			Statistic	Std. Error
Group5PCA	Office	Mean		17.2333	.24419
		95% Confidence Interval for Mean	Lower Bound	16.7498	
			Upper Bound	17.7168	
		5% Trimmed Mean		17.4722	
		Median		18.0000	
		Variance		7.155	
		Std. Deviation		2.67492	
		Minimum		7.00	
		Maximum		20.00	
		Range		13.00	
		Interquartile Range		4.00	
		Skewness		-1.232	.221
		Kurtosis		2.131	.438
	Manufacturing	Mean		16.4853	.25988
		95% Confidence Interval for Mean	Lower Bound	15.9713	
			Upper Bound	16.9993	
		5% Trimmed Mean		16.7582	
		Median		17.0000	
		Variance		9.185	
		Std. Deviation		3.03067	
		Minimum		4.00	
		Maximum		20.00	
		Range		16.00	
		Interquartile Range		4.00	
		Skewness		-1.189	.208
		Kurtosis		2.350	.413

Tests of Normality

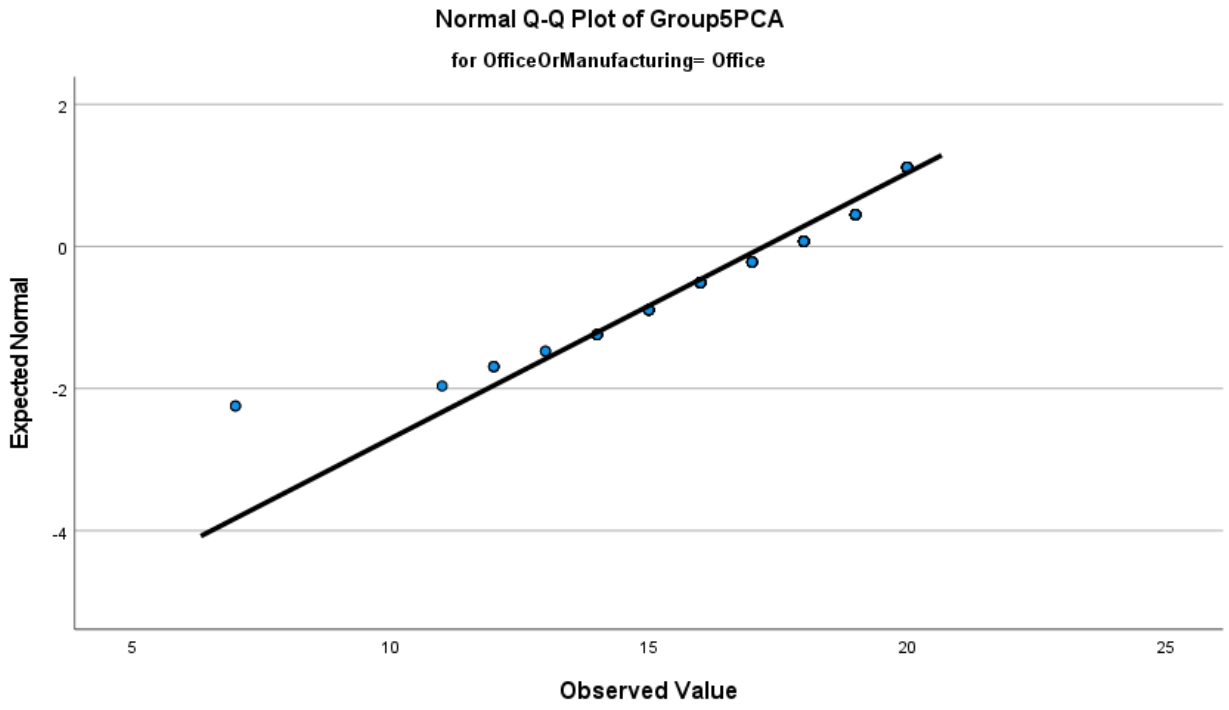
	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group5PCA	Office	.163	120	<.001	.873	120	<.001
	Manufacturing	.128	136	<.001	.895	136	<.001

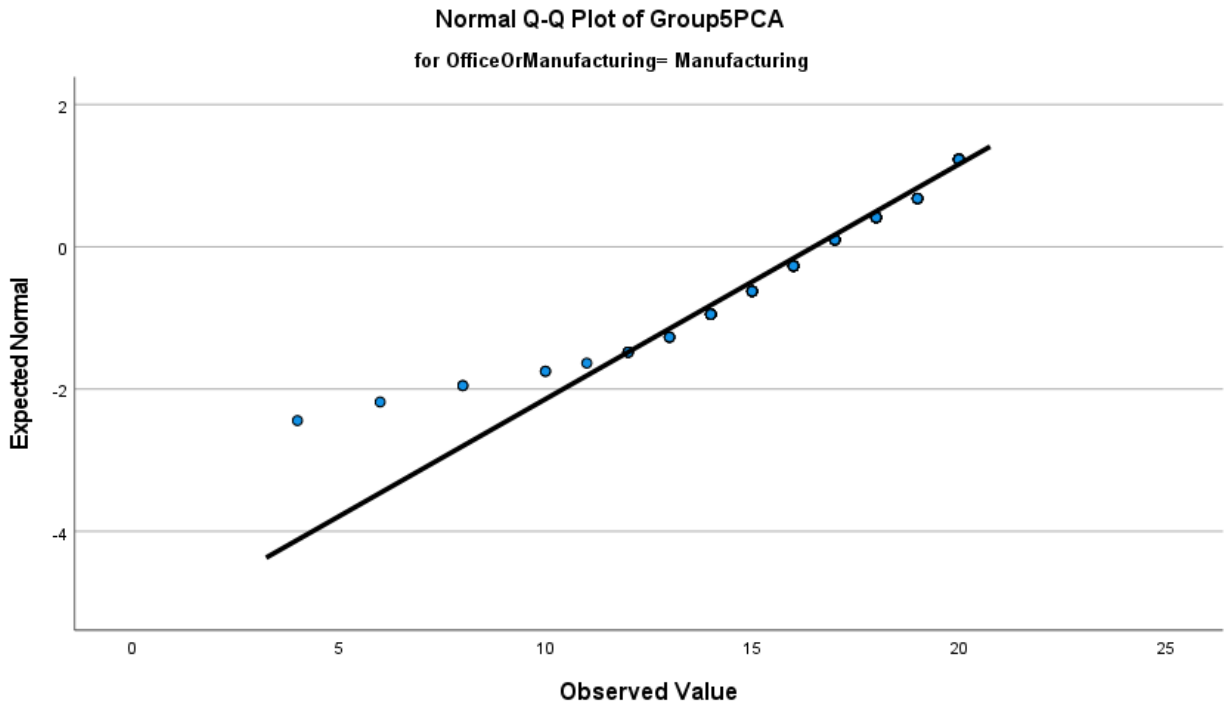
a. Lilliefors Significance Correction

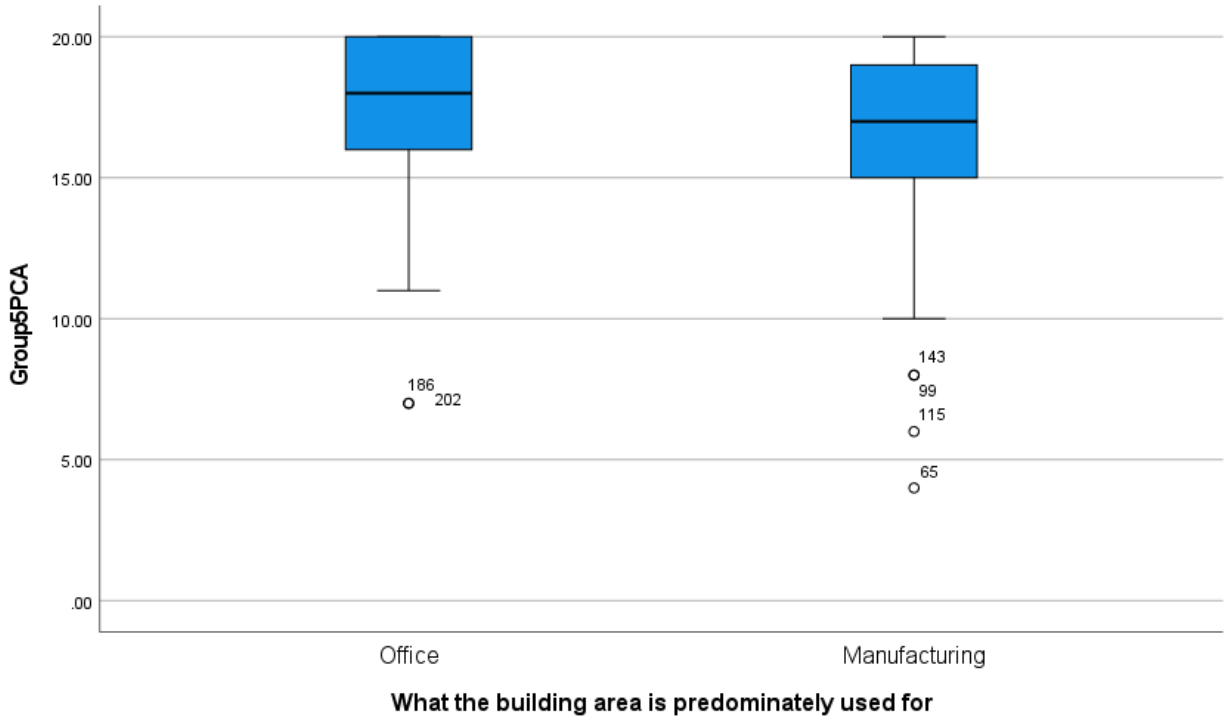




Normal Q-Q Plots


Normal Q-Q Plot of Group5PCA
for OfficeOrManufacturing= Office
Expected Normal
2
0
-2
-4
5
10
15
20
25
Observed Value


Normal Q-Q Plot of Group5PCA
for OfficeOrManufacturing= Manufacturing
Expected Normal
2
0
-2
-4
0
5
10
15
20
25
Observed Value



T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group5PCA	Office	120	17.2333	2.67492	.24419
	Manufacturing	136	16.4853	3.03067	.25988

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group5PCA	Equal variances assumed	.602	.439	2.081	254	.019	.038	.74804	.35939	.04028	1.45580
	Equal variances not assumed			2.098	254.000	.018	.037	.74804	.35660	.04577	1.45031

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Group5PCA	Cohen's d	2.86950	.261	.014	.507
	Hedges' correction	2.87800	.260	.014	.505
	Glass's delta	3.03067	.247	-.001	.494

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

The above highlights 202, 186, 143, 115, 99, 65 as outliers
remove and re-run descriptives and t-test

Explore
What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group5PCA	Office	118	100.0%	0	0.0%	118	100.0%
	Manufacturing	132	100.0%	0	0.0%	132	100.0%

Descriptives

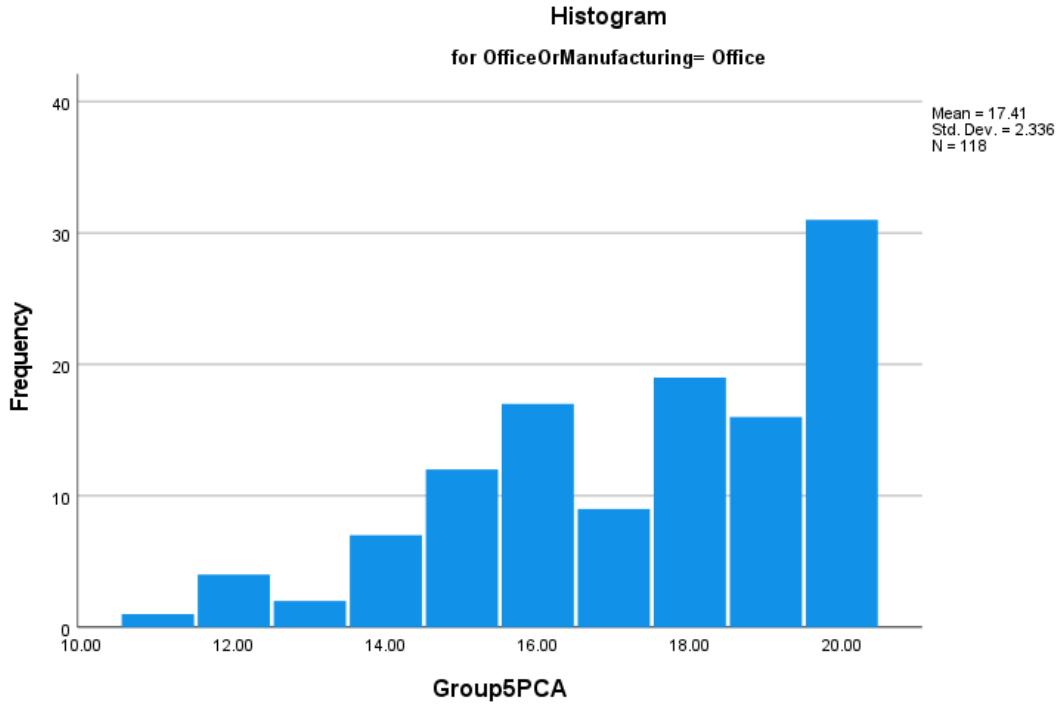
What the building area is predominately used for				Statistic	Std. Error
Group5PCA	Office	Mean		17.4068	.21505
		95% Confidence Interval for Mean	Lower Bound	16.9809	
			Upper Bound	17.8327	
		5% Trimmed Mean		17.5640	
		Median		18.0000	
		Variance		5.457	
		Std. Deviation		2.33603	
		Minimum		11.00	
		Maximum		20.00	
		Range		9.00	
		Interquartile Range		4.00	
		Skewness		-.647	.223
		Kurtosis		-.427	.442
	Manufacturing	Mean		16.7879	.21751
		95% Confidence Interval for Mean	Lower Bound	16.3576	
			Upper Bound	17.2182	
		5% Trimmed Mean		16.9175	
		Median		17.0000	
		Variance		6.245	
		Std. Deviation		2.49895	
		Minimum		10.00	
		Maximum		20.00	
		Range		10.00	
		Interquartile Range		4.00	
		Skewness		-.410	.211
		Kurtosis		-.444	.419

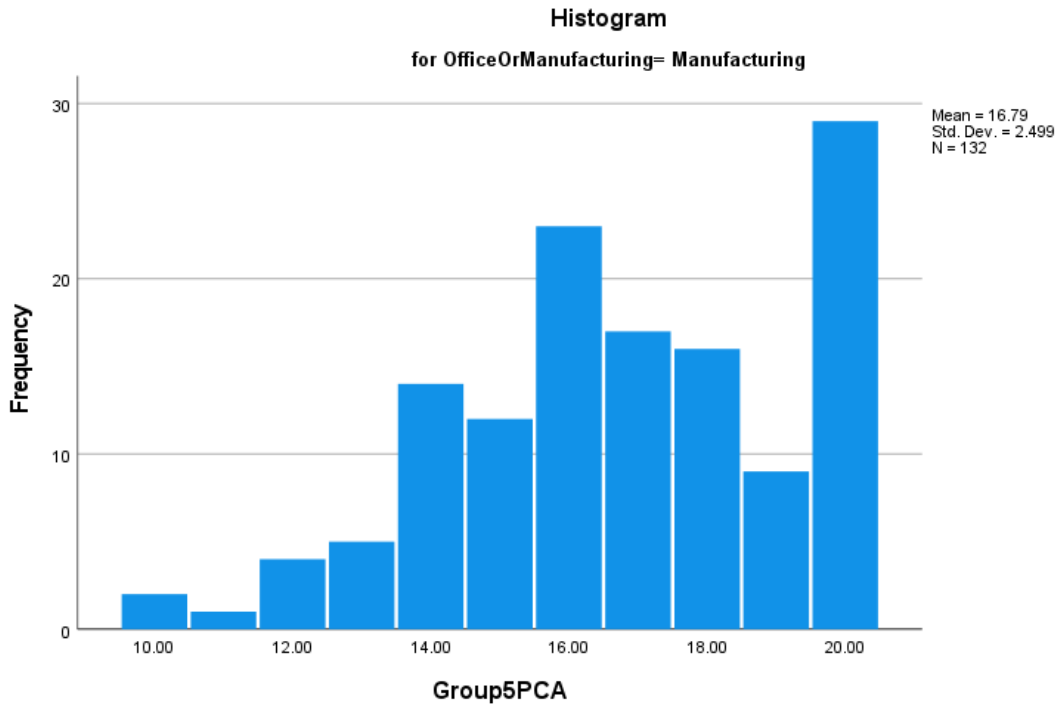
Tests of Normality

	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group5PCA	Office	.160	118	<.001	.902	118	<.001
	Manufacturing	.120	132	<.001	.934	132	<.001

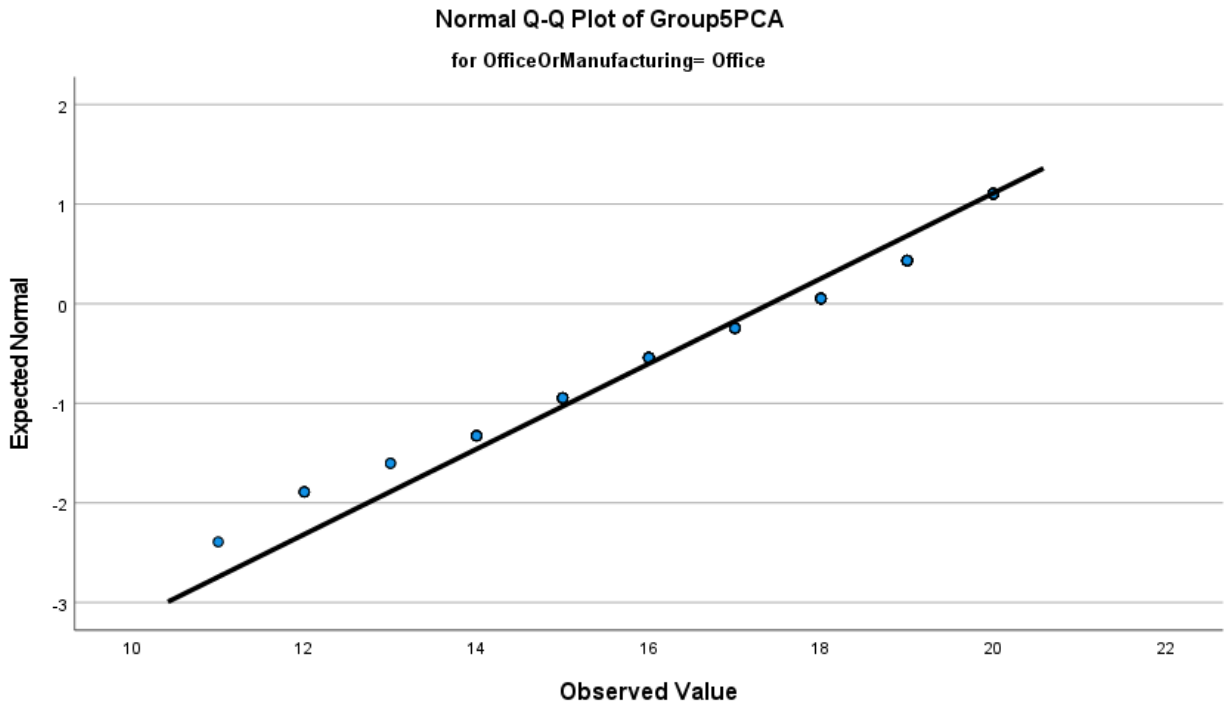
a. Lilliefors Significance Correction

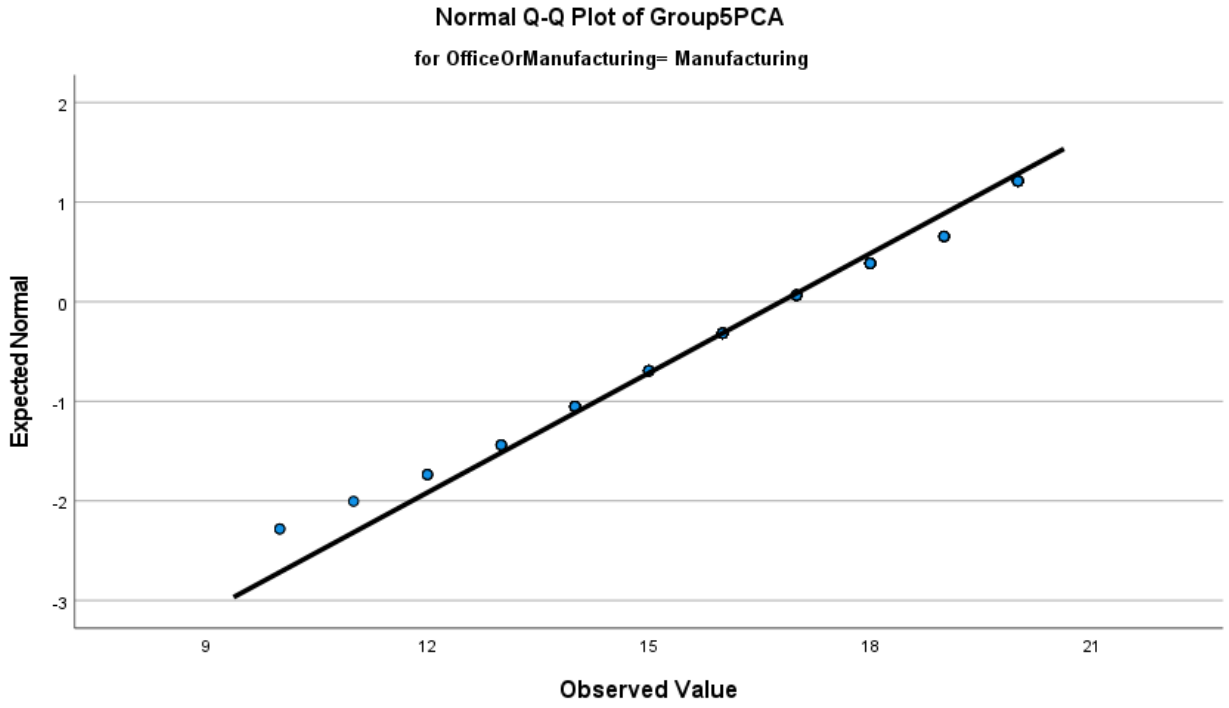
Group5PCA
Histograms

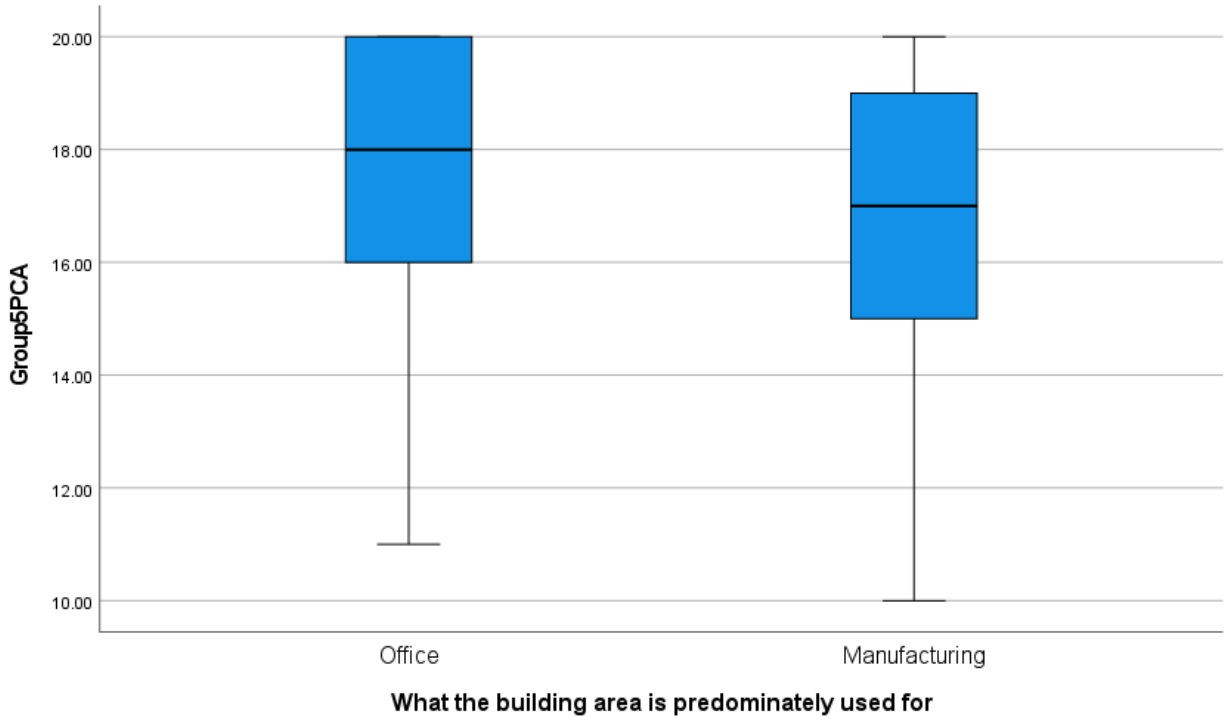




Normal Q-Q Plots


Normal Q-Q Plot of Group5PCA
for OfficeOrManufacturing= Office
Expected Normal
2
1
0
-1
-2
-3
10
12
14
16
18
20
22
Observed Value


Normal Q-Q Plot of Group5PCA
for OfficeOrManufacturing= Manufacturing
Expected Normal
2
1
0
-1
-2
-3
9
12
15
18
21
Observed Value



T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group5PCA	Office	118	17.4068	2.33603	.21505
	Manufacturing	132	16.7879	2.49895	.21751

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group5PCA	Equal variances assumed	.207	.650	2.016	248	.022	.045	.61890	.30703	.01419	1.22361
	Equal variances not assumed			2.023	247.495	.022	.044	.61890	.30587	.01647	1.22134

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval Lower	Upper
Group5PCA	Cohen's d	2.42345	.255	.006	.504
	Hedges' correction	2.43081	.255	.006	.503
	Glass's delta	2.49895	.248	-.003	.497

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

There are no longer any outliers in the data

Shapiro-wilk is significant which suggests data is not normally distributed, confirmed by box and whiskerplots and q-q plots. Not appropriate to undertake independent t-test, explore other options such as mann-whitney test

GROUP 6
Descriptives and t-tests as above

What the building area is predominately used for

Case Processing Summary

		Cases					
	What the building area is predominately used for	Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group6PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

	What the building area is predominately used for			Statistic	Std. Error
Group6PCA	Office	Mean		11.0083	.19174
		95% Confidence Interval for Mean	Lower Bound	10.6287	
			Upper Bound	11.3880	
		5% Trimmed Mean		11.0833	
		Median		11.0000	
		Variance		4.412	
		Std. Deviation		2.10040	
		Minimum		4.00	
		Maximum		15.00	
		Range		11.00	
		Interquartile Range		2.00	
		Skewness		-.686	.221
		Kurtosis		1.150	.438
	Manufacturing	Mean		9.9338	.20537
		95% Confidence Interval for Mean	Lower Bound	9.5277	
			Upper Bound	10.3400	
		5% Trimmed Mean		9.8873	
		Median		10.0000	
		Variance		5.736	
		Std. Deviation		2.39506	
		Minimum		5.00	
		Maximum		15.00	
		Range		10.00	
		Interquartile Range		4.00	
		Skewness		.076	.208

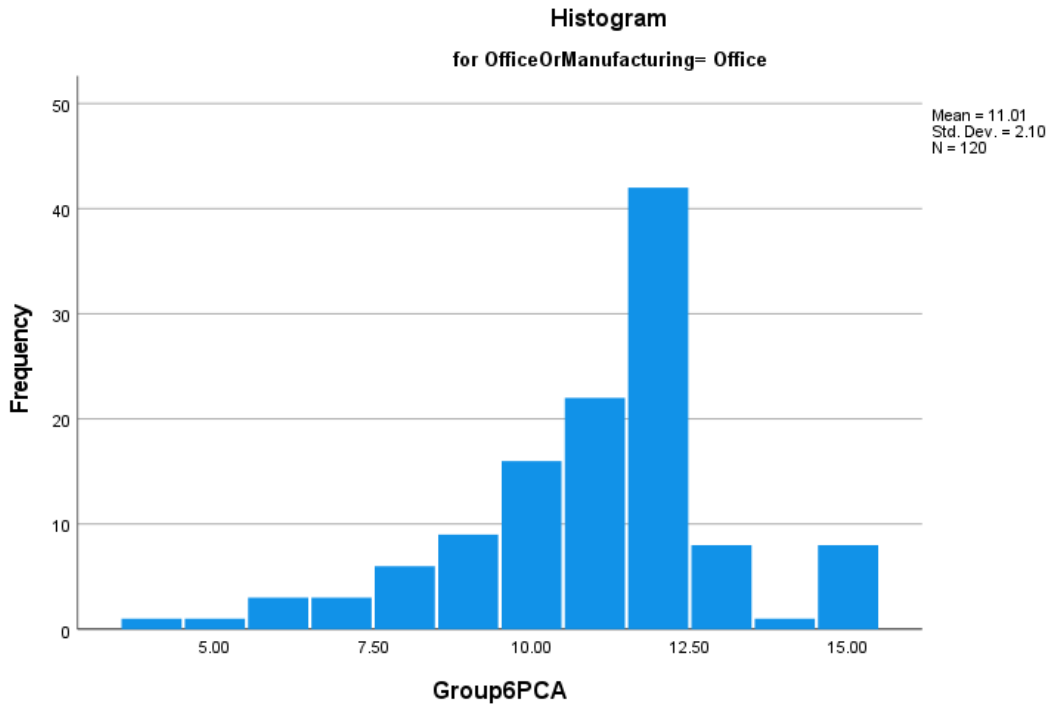
	Kurtosis	-.535	.413

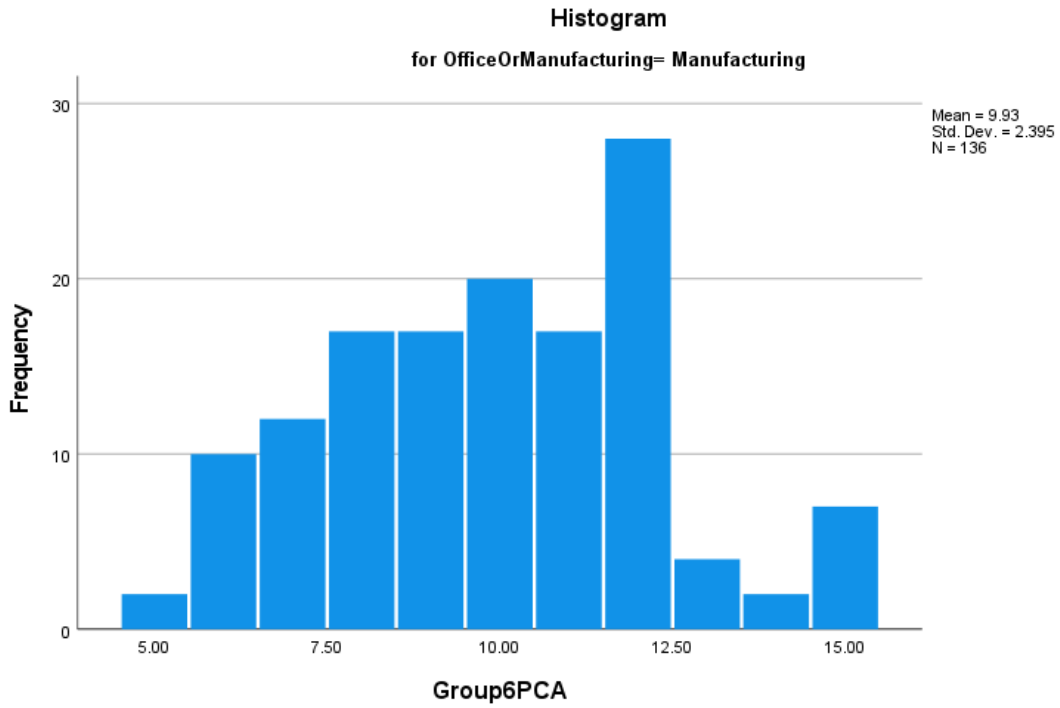
Tests of Normality

	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group6PCA	Office	.177	120	<.001	.920	120	<.001
	Manufacturing	.107	136	<.001	.963	136	<.001

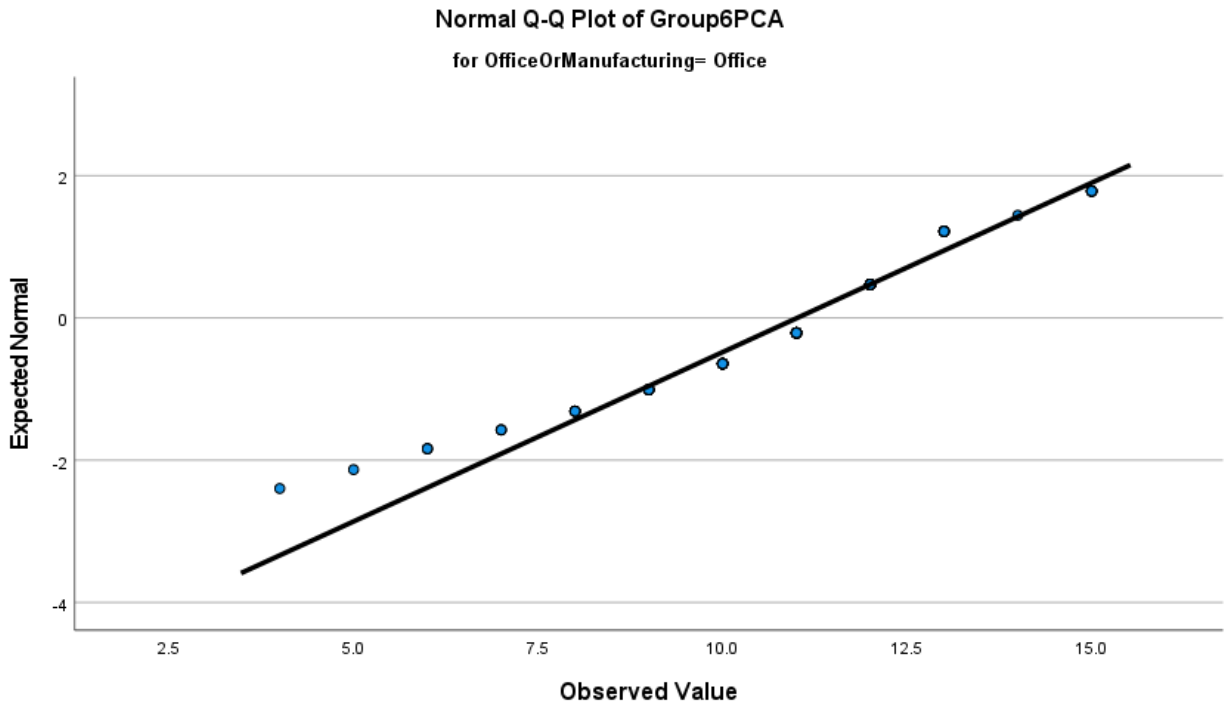
a. Lilliefors Significance Correction

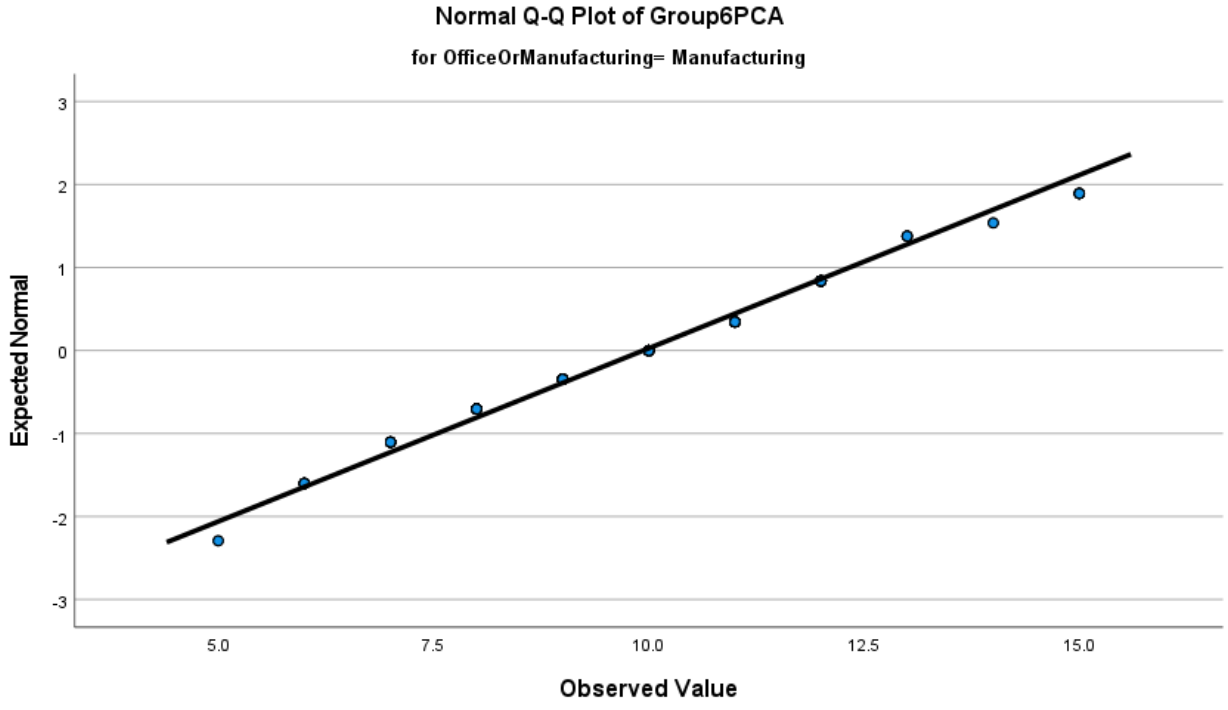
Group6PCA
Histograms

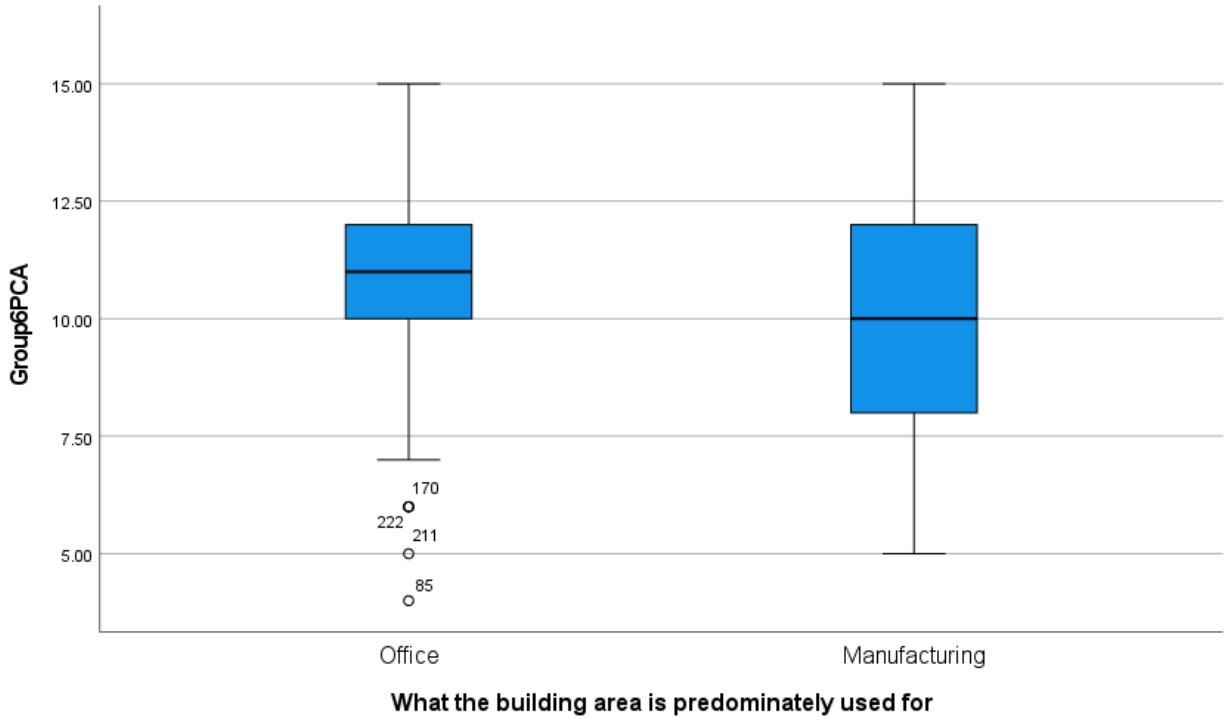




Normal Q-Q Plots







T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group6PCA	Office	120	11.0083	2.10040	.19174
	Manufacturing	136	9.9338	2.39506	.20537

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group6PCA	Equal variances assumed	5.701	.018	3.793	254	<.001	<.001	1.07451	.28328	.51664	1.63238
	Equal variances not assumed			3.824	253.992	<.001	<.001	1.07451	.28097	.52119	1.62783

Independent Samples Effect Sizes

				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Group6PCA	Cohen's d	2.26180	.475	.226	.724
	Hedges' correction	2.26850	.474	.225	.721

	Glass's delta	2.39506	.449	.197	.699

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

Several outliers found - 222, 211, 170, 85

Remove and re-run descriptives and t-test

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group6PCA	Office	116	100.0%	0	0.0%	116	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

	What the building area is predominately used for			Statistic	Std. Error
Group6PCA	Office	Mean		11.2069	.16989
		95% Confidence Interval for Mean	Lower Bound	10.8704	
			Upper Bound	11.5434	
		5% Trimmed Mean		11.2222	
		Median		12.0000	
		Variance		3.348	
		Std. Deviation		1.82979	
		Minimum		6.00	
		Maximum		15.00	
		Range		9.00	
		Interquartile Range		2.00	
		Skewness		-.234	.225
		Kurtosis		.494	.446
	Manufacturing	Mean		9.9338	.20537
		95% Confidence Interval for Mean	Lower Bound	9.5277	
			Upper Bound	10.3400	
		5% Trimmed Mean		9.8873	
		Median		10.0000	
		Variance		5.736	
		Std. Deviation		2.39506	
		Minimum		5.00	
		Maximum		15.00	
		Range		10.00	
		Interquartile Range		4.00	
		Skewness		.076	.208

	Kurtosis	-.535	.413

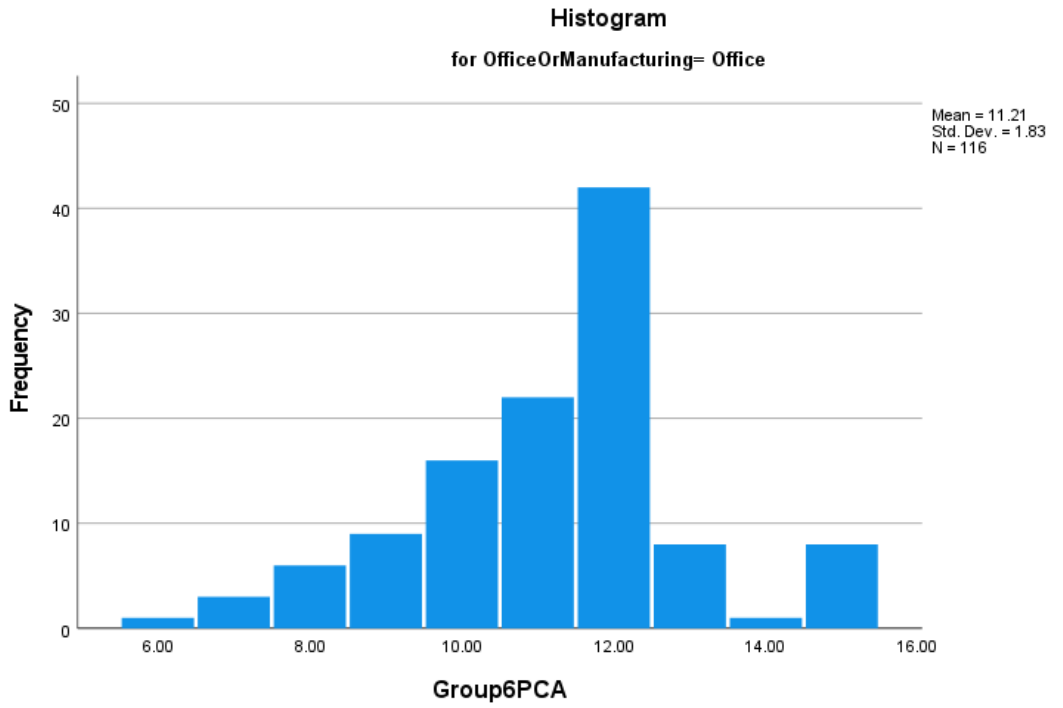
Tests of Normality

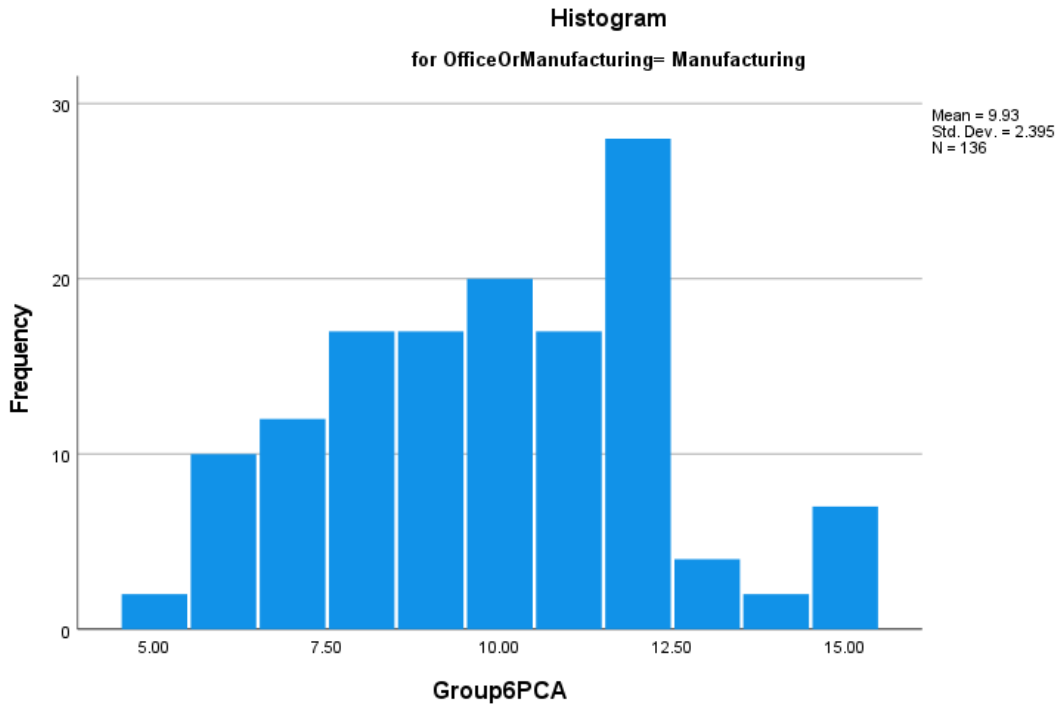
	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group6PCA	Office	.186	116	<.001	.933	116	<.001
	Manufacturing	.107	136	<.001	.963	136	<.001

a. Lilliefors Significance Correction

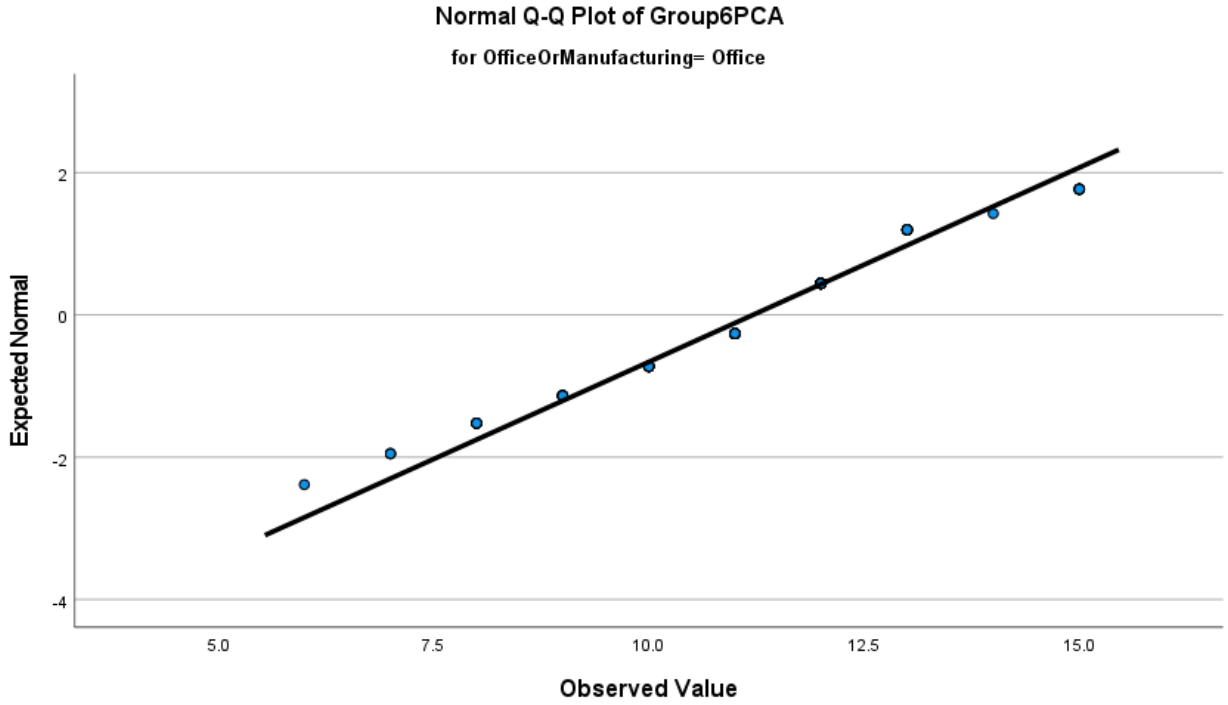
Group6PCA

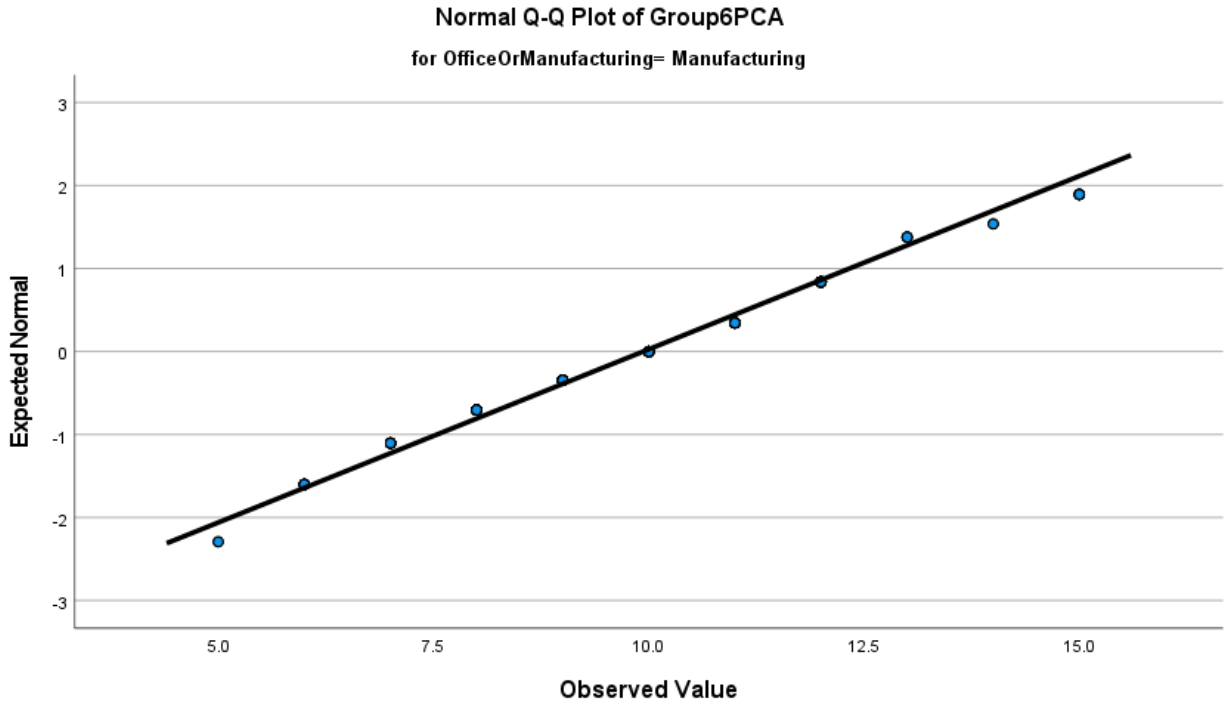
Histograms

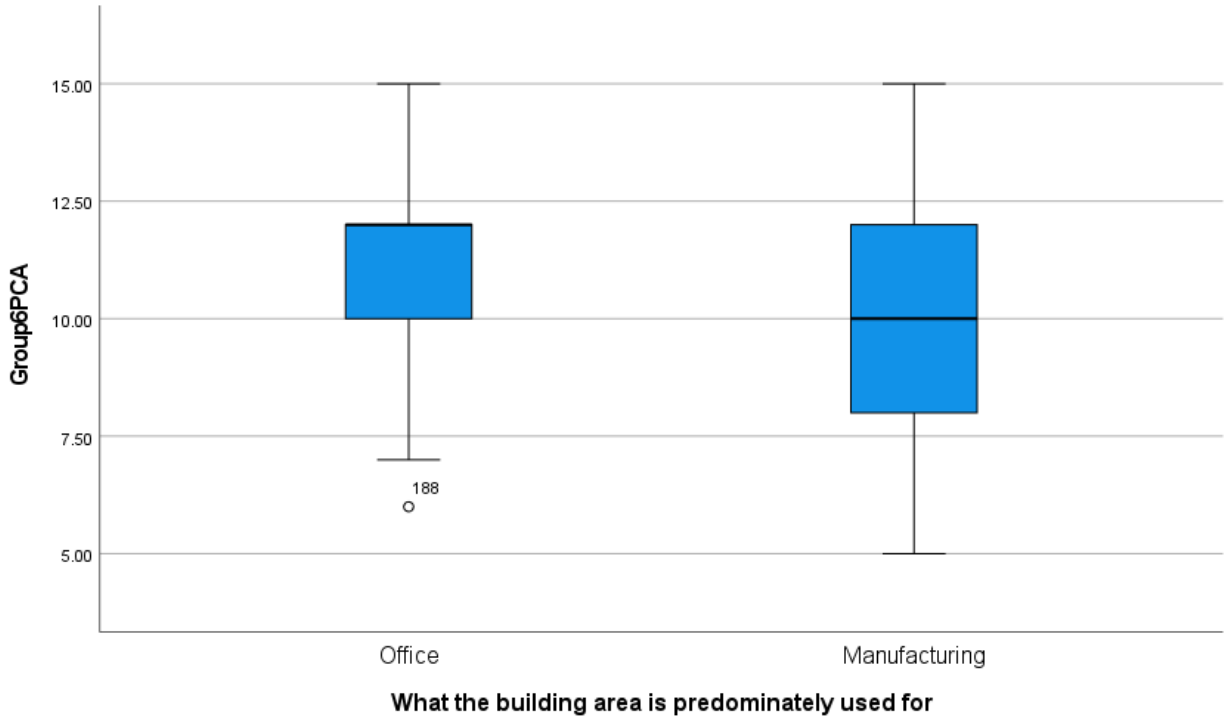




Normal Q-Q Plots







T-Test

roup Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group6PCA	Office	116	11.2069	1.82979	.16989
	Manufacturing	136	9.9338	2.39506	.20537

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
						Significance				95% Confidence Interval of the Difference
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group6PCA	Equal variances assumed	12.114	<.001	4.677	250	<.001	<.001	1.27307	.27218	.73702	1.80913
	Equal variances not assumed			4.776	247.129	<.001	<.001	1.27307	.26654	.74810	1.79805

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Group6PCA	Cohen's d	2.15354	.591	.338	.844
	Hedges' correction	2.16003	.589	.337	.841
	Glass's delta	2.39506	.532	.275	.786

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

Further outlier identifed - 188
removed and re-run descriptives and t-test

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group6PCA	Office	115	100.0%	0	0.0%	115	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

What the building area is predominately used for				Statistic	Std. Error
Group6PCA	Office	Mean		11.2522	.16518
		95% Confidence Interval for Mean	Lower Bound	10.9250	
			Upper Bound	11.5794	
		5% Trimmed Mean		11.2536	
		Median		12.0000	
		Variance		3.138	
		Std. Deviation		1.77133	
		Minimum		7.00	
		Maximum		15.00	
		Range		8.00	
		Interquartile Range		2.00	
		Skewness		-.112	.226
		Kurtosis		.344	.447
	Manufacturing	Mean		9.9338	.20537
		95% Confidence Interval for Mean	Lower Bound	9.5277	
			Upper Bound	10.3400	
		5% Trimmed Mean		9.8873	
		Median		10.0000	
		Variance		5.736	
		Std. Deviation		2.39506	
		Minimum		5.00	
		Maximum		15.00	
		Range		10.00	
		Interquartile Range		4.00	
		Skewness		.076	.208
		Kurtosis		-.535	.413

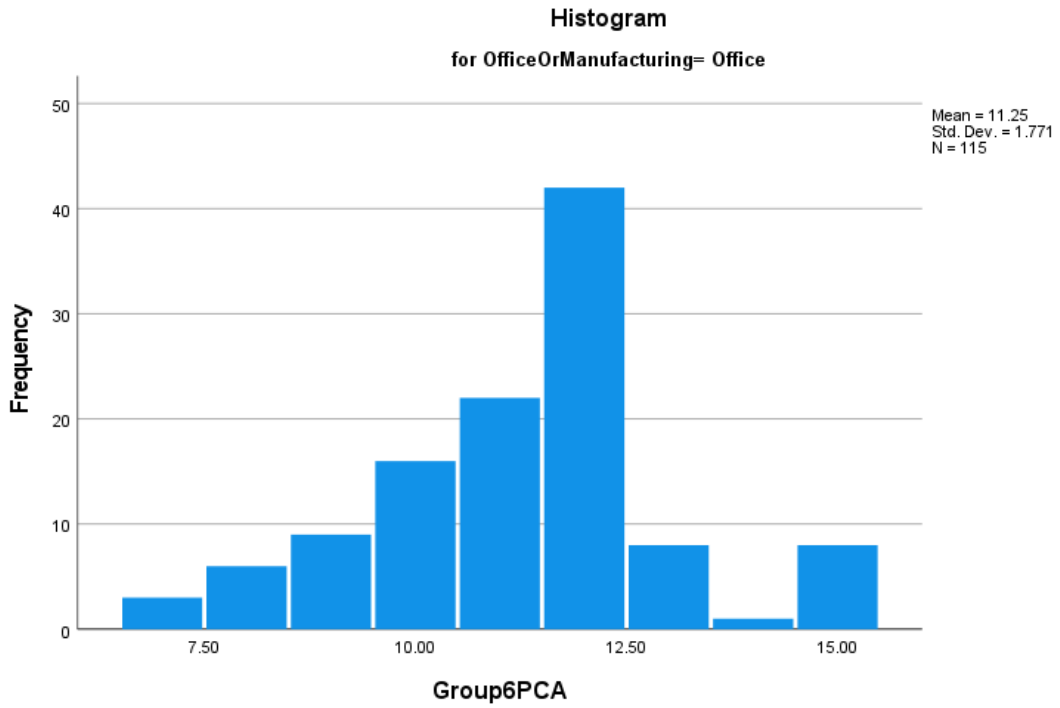
Tests of Normality

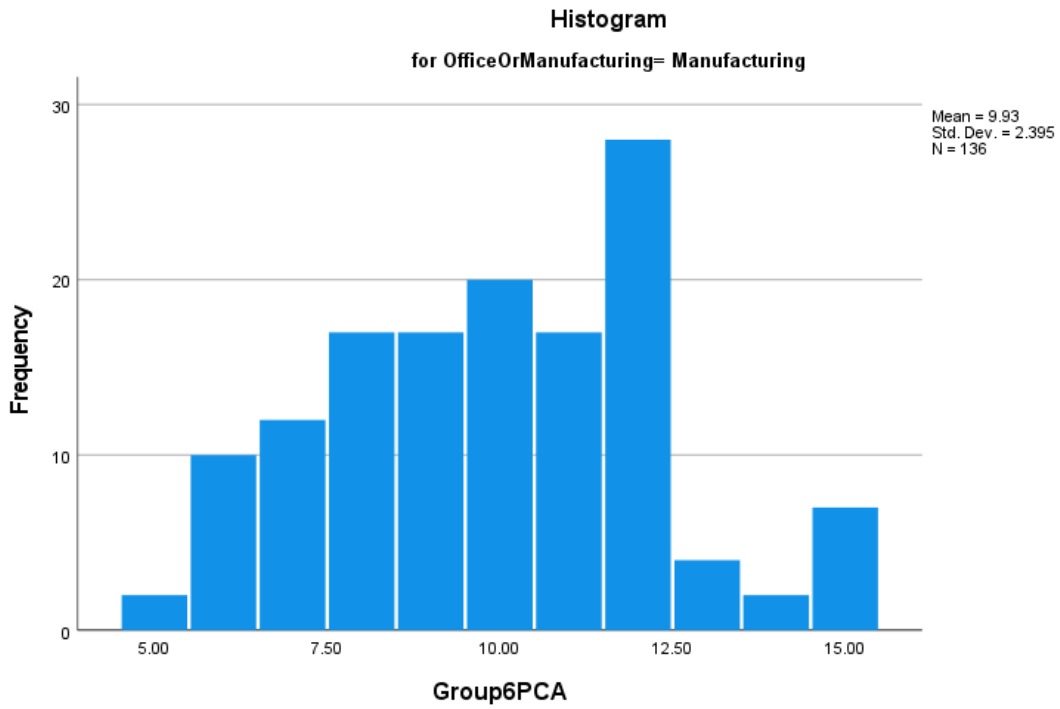
	What the building area is predominately used for	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Group6PCA	Office	.189	115	<.001	.931	115	<.001
	Manufacturing	.107	136	<.001	.963	136	<.001

a. Lilliefors Significance Correction

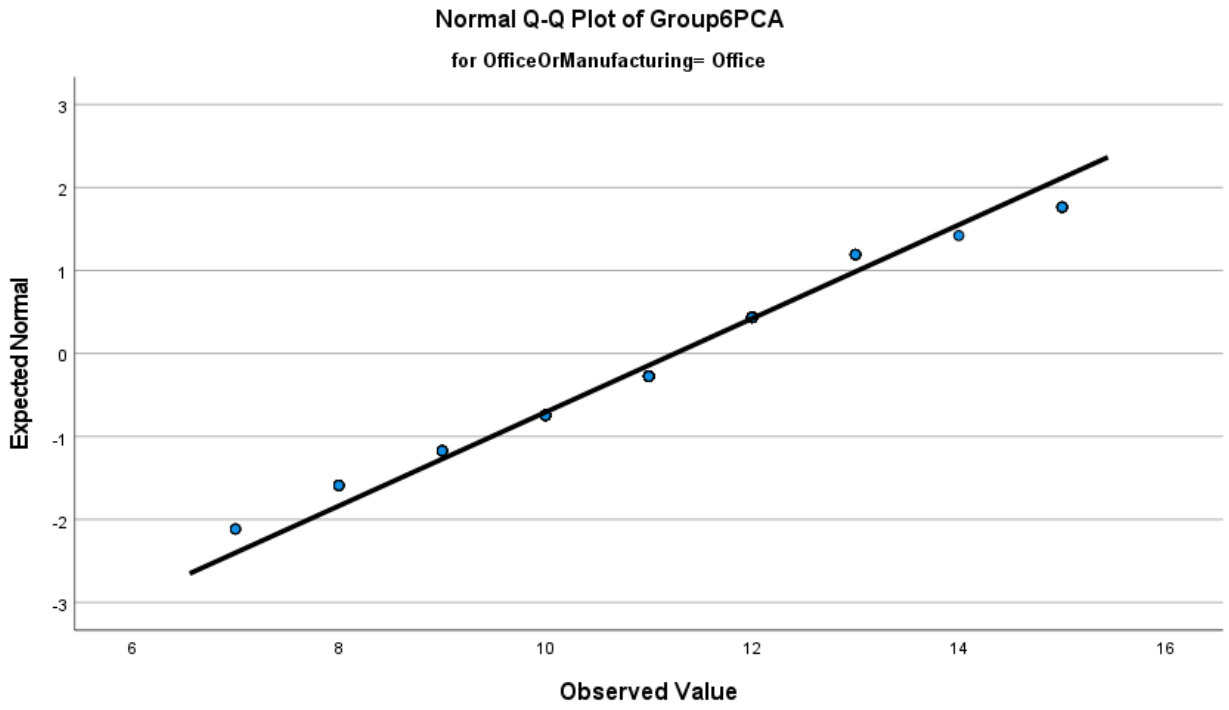
Group6PCA

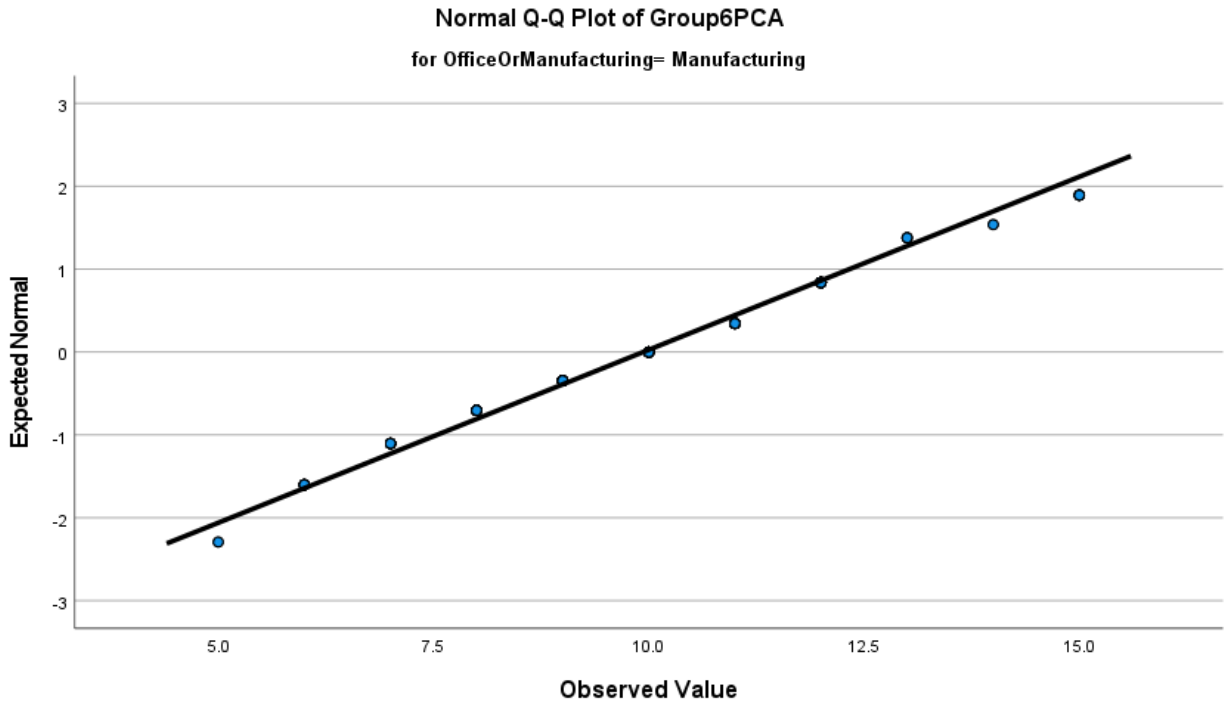
Histograms

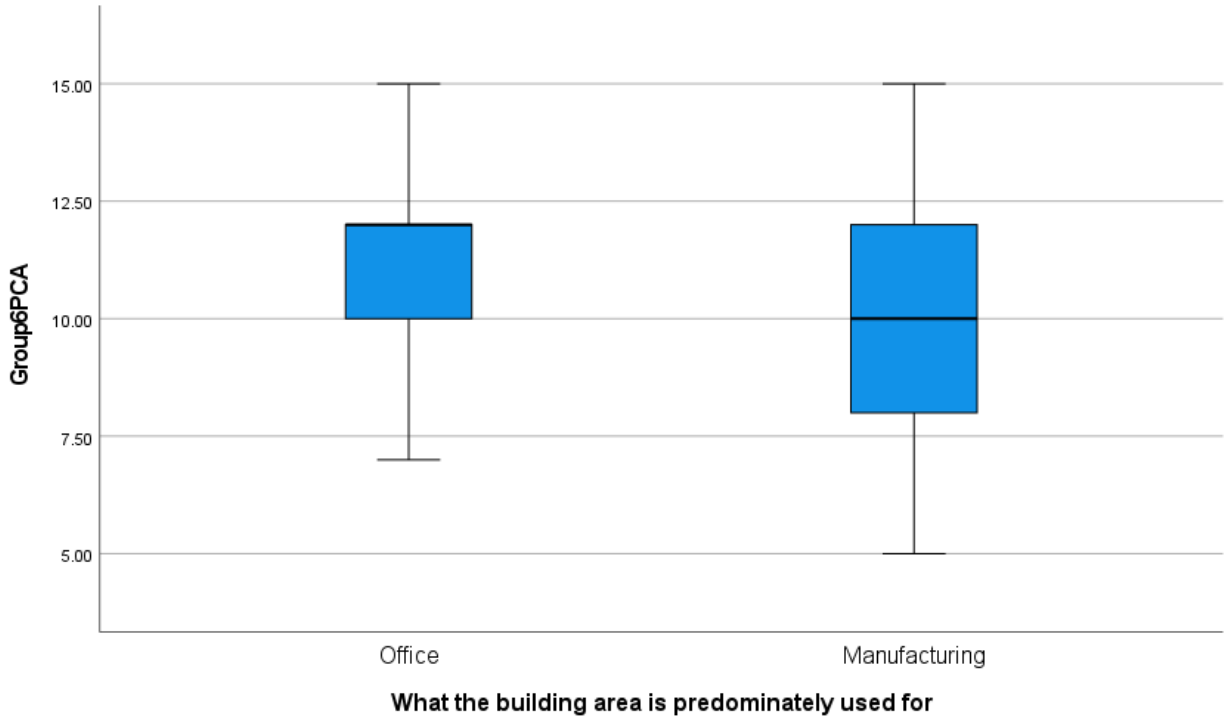




Normal Q-Q Plots







T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group6PCA	Office	115	11.2522	1.77133	.16518
	Manufacturing	136	9.9338	2.39506	.20537

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group6PCA	Equal variances assumed	14.006	<.001	4.881	249	<.001	<.001	1.31835	.27012	.78634	1.85037
	Equal variances not assumed			5.002	244.826	<.001	<.001	1.31835	.26356	.79922	1.83748

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Group6PCA	Cohen's d	2.13226	.618	.364	.872
	Hedges' correction	2.13871	.616	.362	.869
	Glass's delta	2.39506	.550	.293	.806

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

There are no longer any outliers in the data
Shapiro-wilk is significant which suggests data is not normally distributed, confirmed by box and whiskerplots and q-q plots.
Not appropriate to undertake independent t-test, explore other options such as mann-whitney test

GROUP 7
what the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group7PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

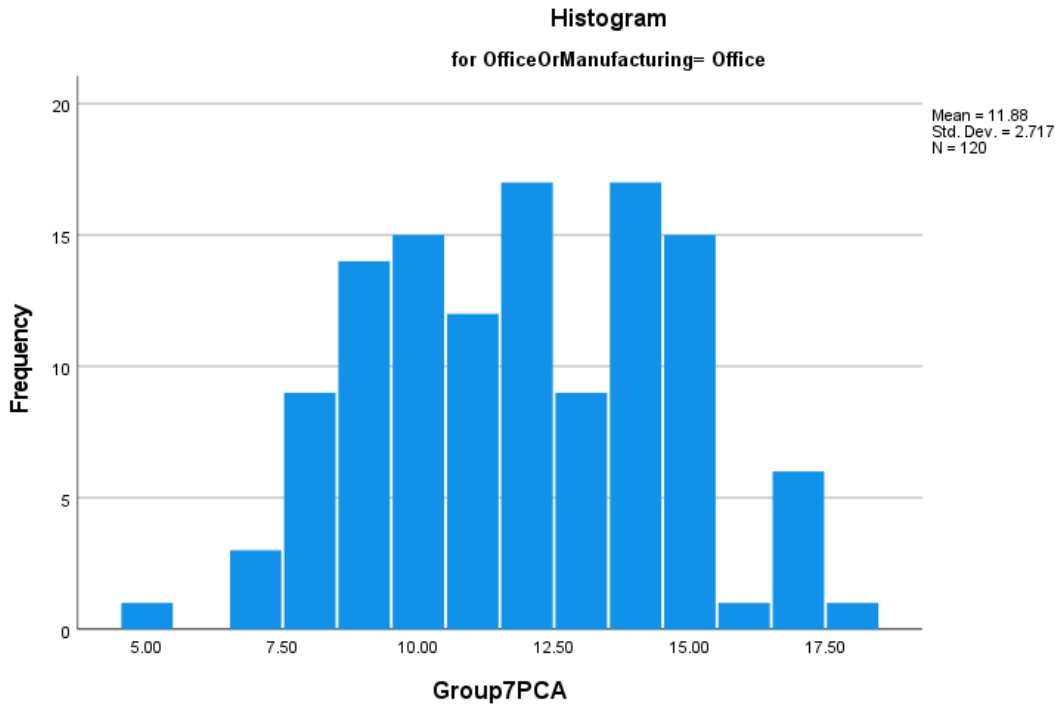
Descriptives

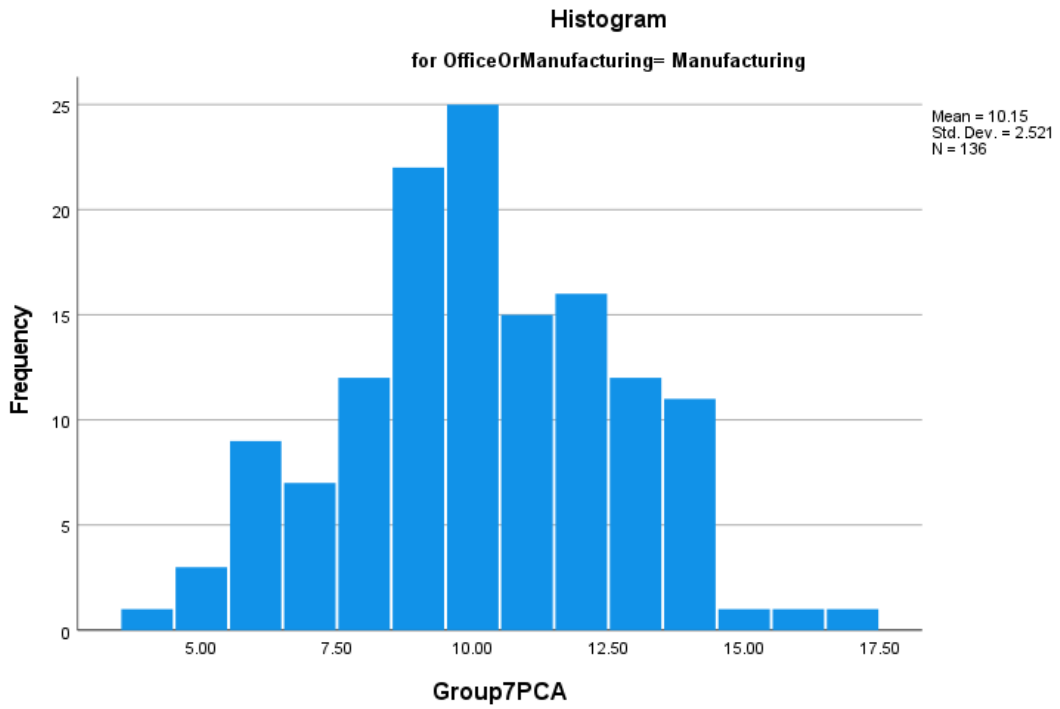
What the building area is predominately used for			Statistic	Std. Error
Group7PCA	Office	Mean	11.8833	.24801
		95% Confidence Interval for Mean — Lower Bound	11.3922	
		95% Confidence Interval for Mean — Upper Bound	12.3744	
		5% Trimmed Mean	11.8611	
		Median	12.0000	
		Variance	7.381	
		Std. Deviation	2.71684	
		Minimum	5.00	
		Maximum	18.00	
		Range	13.00	
		Interquartile Range	4.00	
		Skewness	.036	.221
		Kurtosis	-.687	.438
	Manufacturing	Mean	10.1544	.21615
		95% Confidence Interval for Mean — Lower Bound	9.7269	
		95% Confidence Interval for Mean — Upper Bound	10.5819	
		5% Trimmed Mean	10.1634	
		Median	10.0000	
		Variance	6.354	
		Std. Deviation	2.52067	
		Minimum	4.00	
		Maximum	17.00	
		Range	13.00	
		Interquartile Range	3.00	
		Skewness	-.008	.208
		Kurtosis	-.282	.413

Tests of Normality

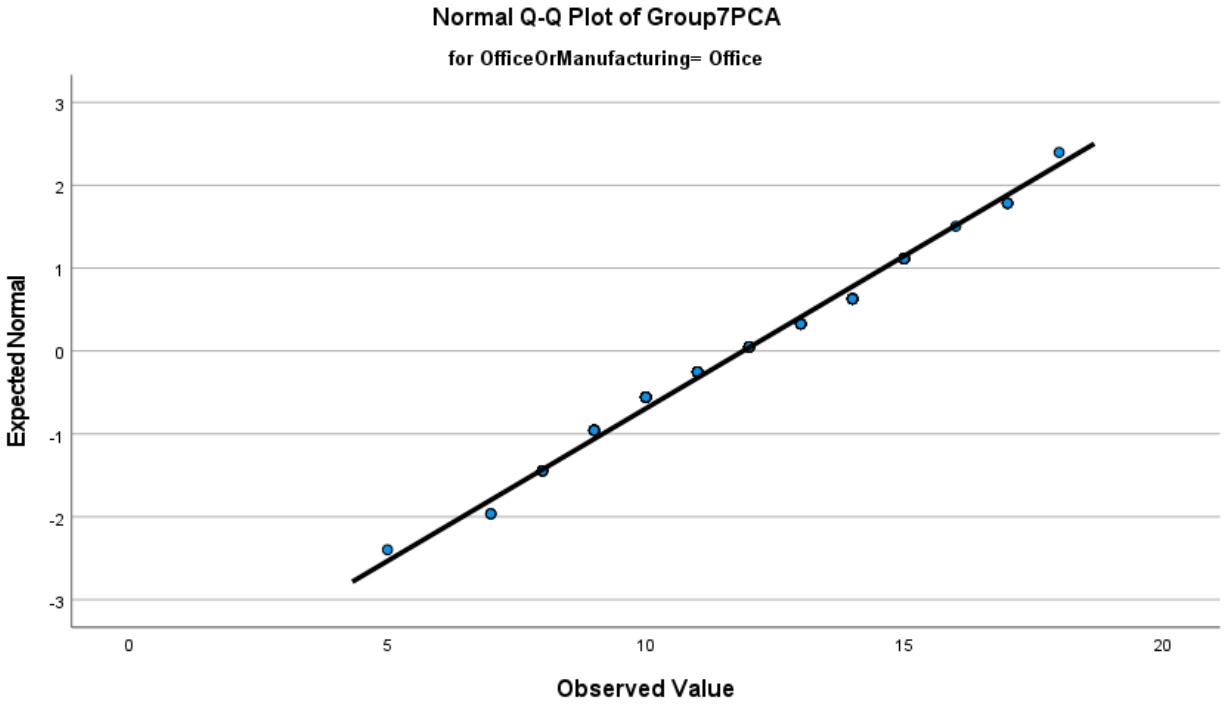
	What the building area is predominately used for	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Group7PCA	Office	.115	120	<.001	.972	120	.012
	Manufacturing	.105	136	<.001	.980	136	.047

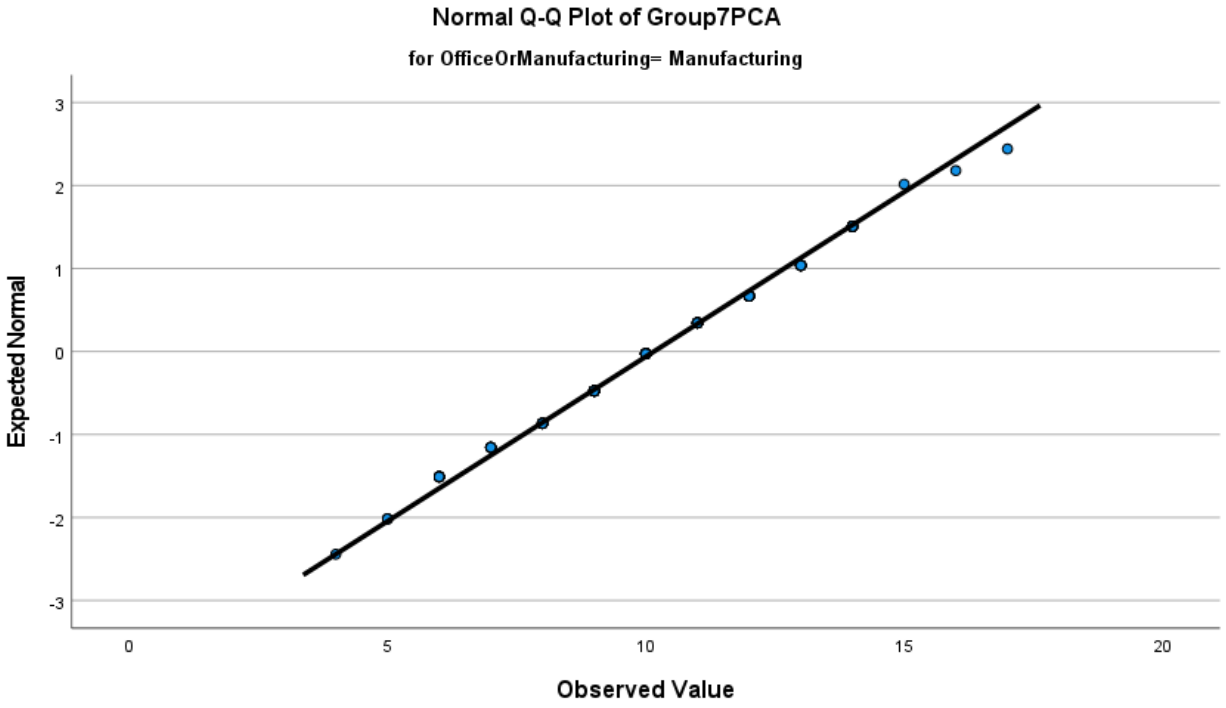
a. Lilliefors Significance Correction

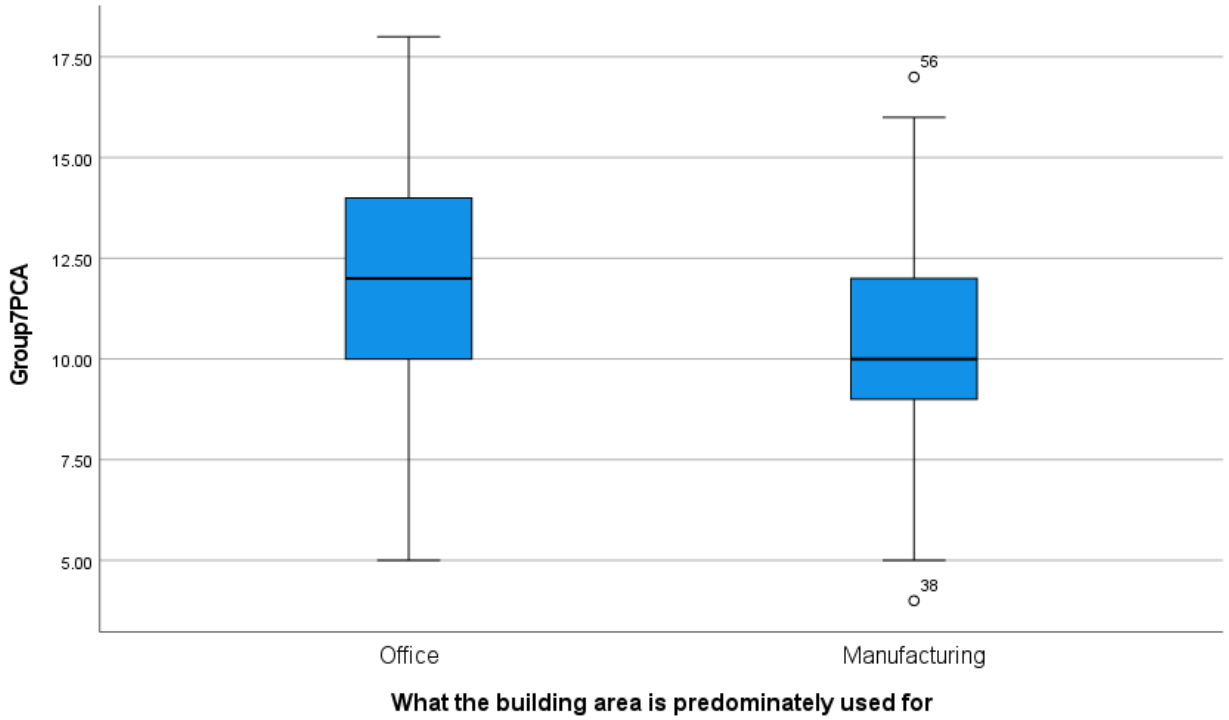




Normal Q-Q Plots


Normal Q-Q Plot of Group7PCA
for OfficeOrManufacturing= Office
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
0
5
10
15
20


Normal Q-Q Plot of Group7PCA
for OfficeOrManufacturing= Manufacturing
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
0
5
10
15
20



Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group7PCA	Office	120	11.8833	2.71684	.24801
	Manufacturing	136	10.1544	2.52067	.21615

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group7PCA	Equal variances assumed	1.880	.172	5.280	254	<.001	<.001	1.72892	.32744	1.08408	2.37377
	Equal variances not assumed			5.255	244.225	<.001	<.001	1.72892	.32898	1.08092	2.37693

Independent Samples Effect Sizes

				95% Confidence Interval	
		Standardizer[a]	Point Estimate	Lower	Upper
Group7PCA	Cohen's d	2.61441	.661	.409	.913
	Hedges' correction	2.62216	.659	.407	.910
	Glass's delta	2.52067	.686	.426	.943

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

The above identifes 38 and 56 as outliers. Remove these and re-run test

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group7PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	134	100.0%	0	0.0%	134	100.0%

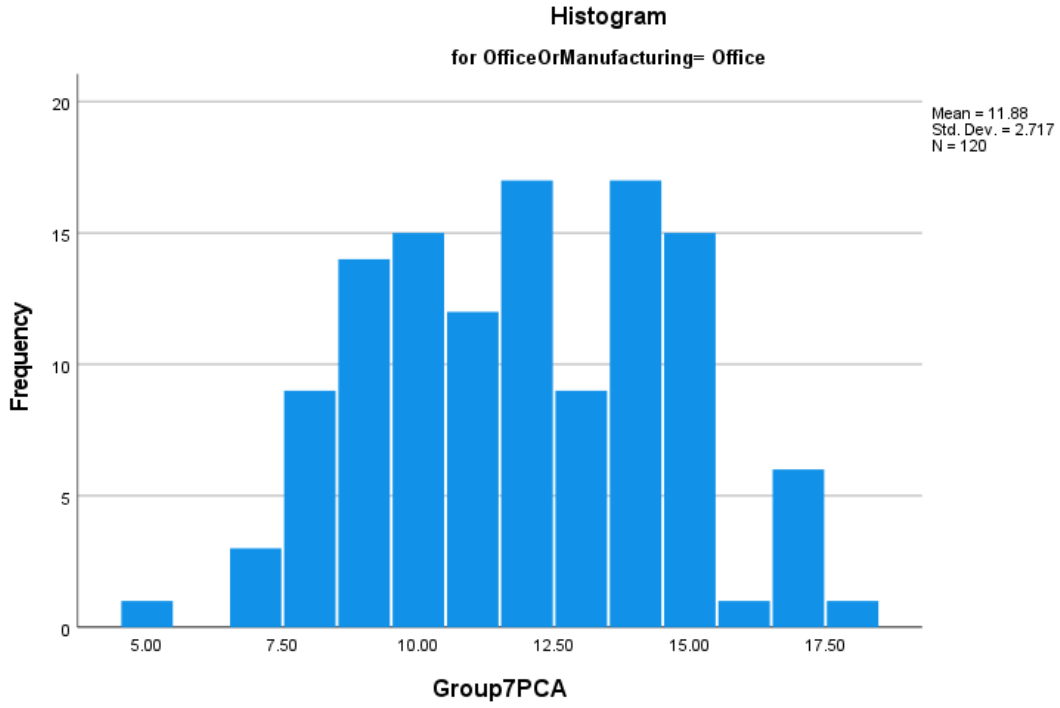
Descriptives

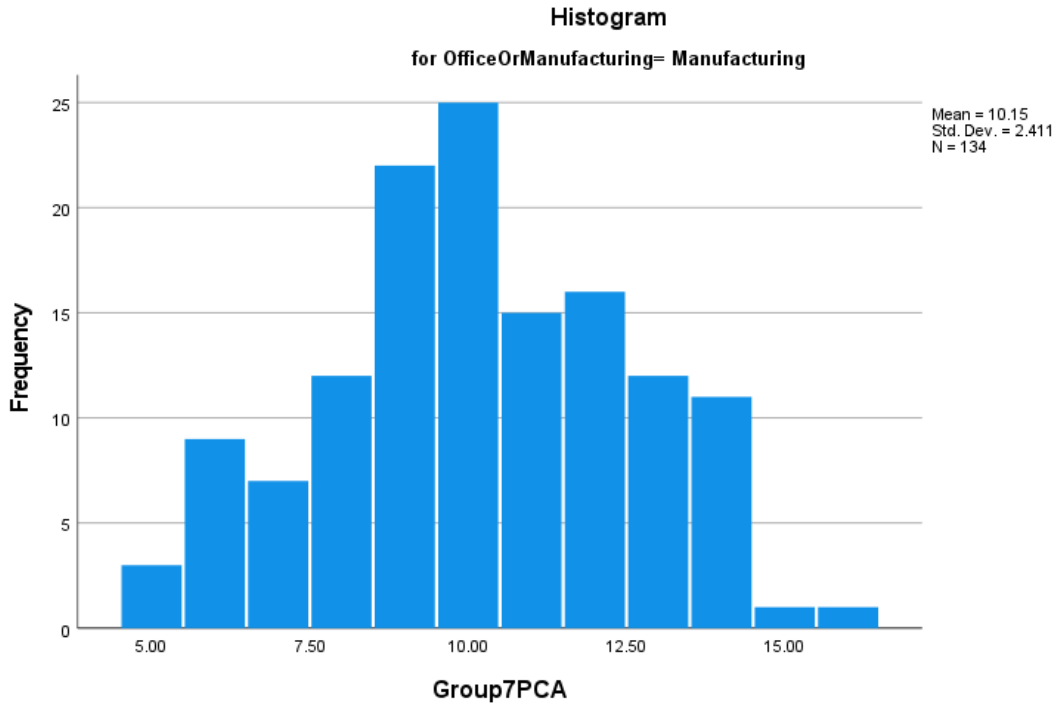
What the building area is predominately used for				Statistic	Std. Error
Group7PCA	Office	Mean		11.8833	.24801
		95% Confidence Interval for Mean	Lower Bound	11.3922	
			Upper Bound	12.3744	
		5% Trimmed Mean		11.8611	
		Median		12.0000	
		Variance		7.381	
		Std. Deviation		2.71684	
		Minimum		5.00	
		Maximum		18.00	
		Range		13.00	
		Interquartile Range		4.00	
		Skewness		.036	.221
		Kurtosis		-.687	.438
	Manufacturing	Mean		10.1493	.20826
		95% Confidence Interval for Mean	Lower Bound	9.7373	
			Upper Bound	10.5612	
		5% Trimmed Mean		10.1658	
		Median		10.0000	
		Variance		5.812	
		Std. Deviation		2.41084	
		Minimum		5.00	
		Maximum		16.00	
		Range		11.00	
		Interquartile Range		3.00	
		Skewness		-.050	.209
		Kurtosis		-.533	.416

Tests of Normality

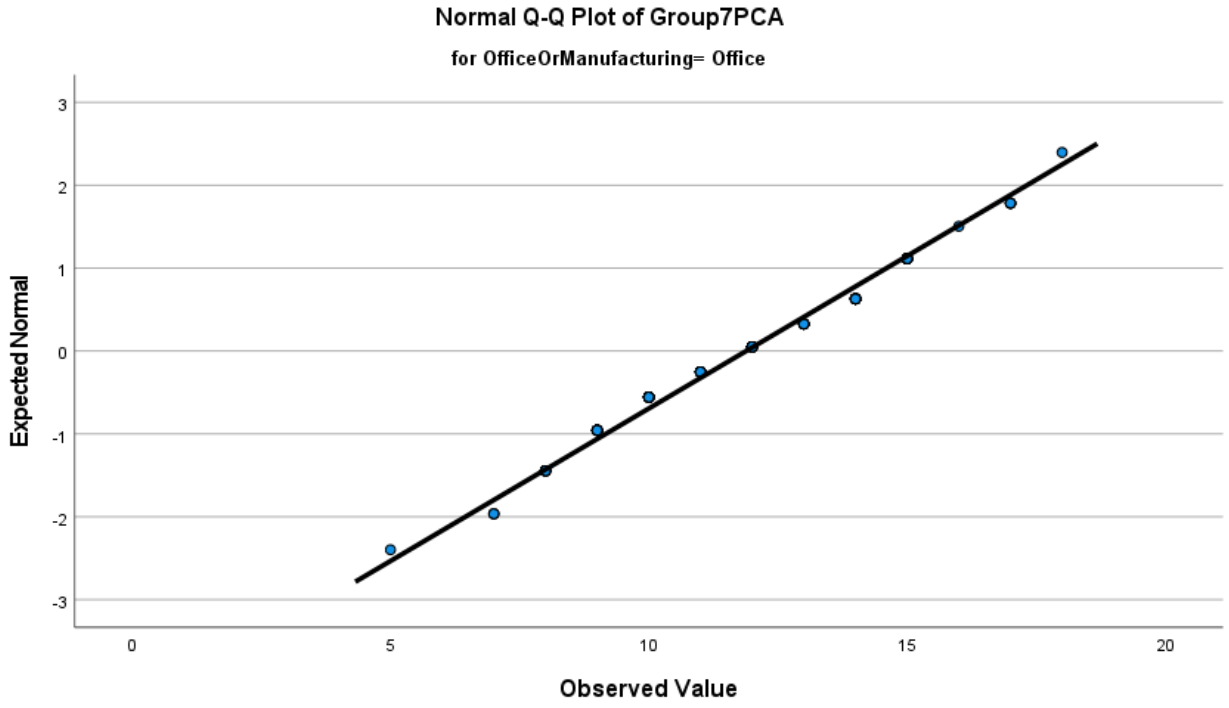
	What the building area is predominately used for	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Group7PCA	Office	.115	120	<.001	.972	120	.012
	Manufacturing	.107	134	<.001	.974	134	.010

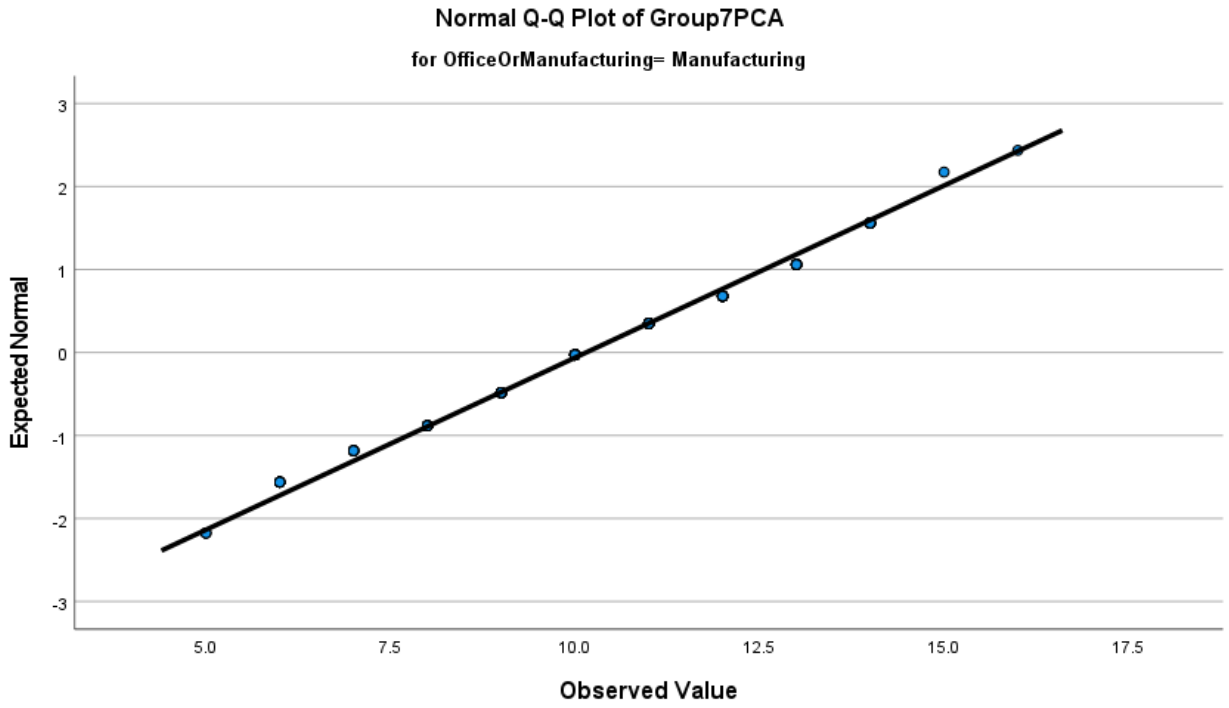
a. Lilliefors Significance Correction





Normal Q-Q Plots


Normal Q-Q Plot of Group7PCA
for OfficeOrManufacturing= Office
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
0
5
10
15
20


Normal Q-Q Plot of Group7PCA
for OfficeOrManufacturing= Manufacturing
Expected Normal
Observed Value
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-2
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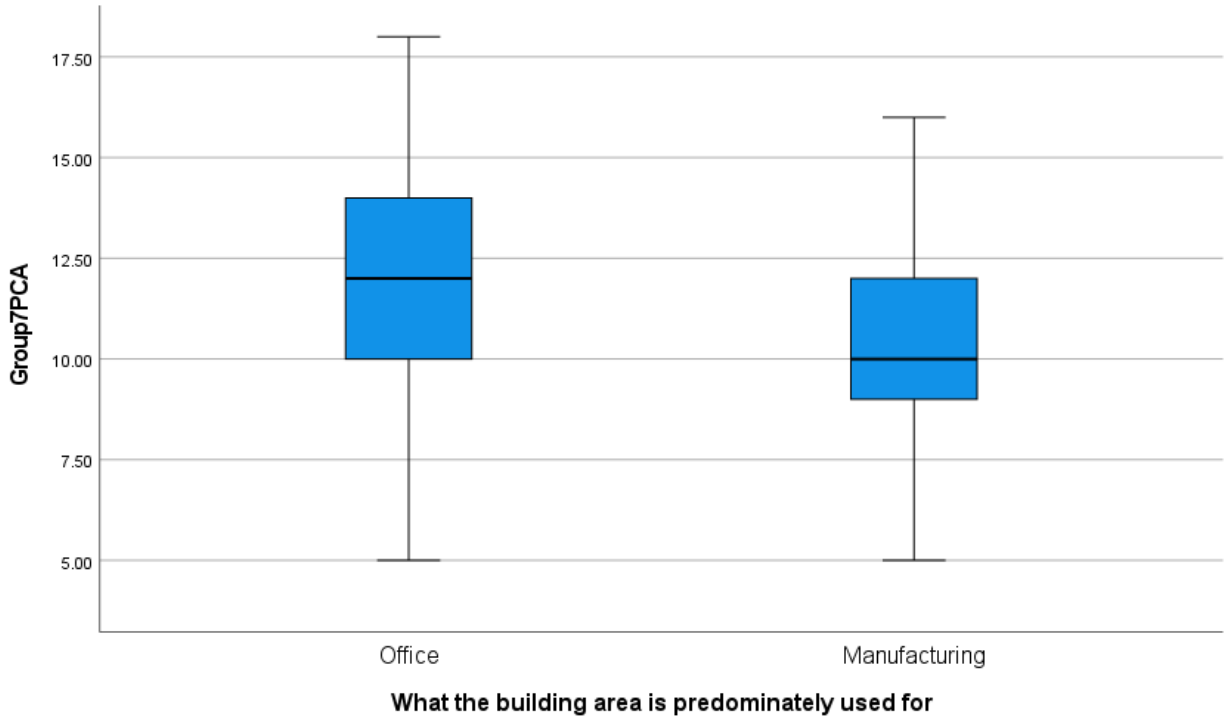
7.5
10.0
12.5
15.0
17.5



T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group7PCA	Office	120	11.8833	2.71684	.24801
	Manufacturing	134	10.1493	2.41084	.20826

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group7PCA	Equal variances assumed	3.178	.076	5.390	252	<.001	<.001	1.73408	.32173	1.10045	2.36771
	Equal variances not assumed			5.354	239.462	<.001	<.001	1.73408	.32386	1.09610	2.37206

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Group7PCA	Cohen's d	2.55990	.677	.423	.930
	Hedges' correction	2.56755	.675	.422	.927

	Glass's delta	2.41084	.719	.457	.979

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

group 8

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group8PCA	Office	120	100.0%	0	0.0%	120	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

What the building area is predominately used for				Statistic	Std. Error
Group8PCA	Office	Mean		6.9833	.15610
		95% Confidence Interval for Mean	Lower Bound	6.6742	
			Upper Bound	7.2924	
		5% Trimmed Mean		7.0370	
		Median		7.0000	
		Variance		2.924	
		Std. Deviation		1.71000	
		Minimum		2.00	
		Maximum		10.00	
		Range		8.00	
		Interquartile Range		2.00	
		Skewness		-.620	.221
		Kurtosis		.097	.438
	Manufacturing	Mean		6.2353	.13416
		95% Confidence Interval for Mean	Lower Bound	5.9700	
			Upper Bound	6.5006	
		5% Trimmed Mean		6.2696	
		Median		6.0000	
		Variance		2.448	
		Std. Deviation		1.56459	
		Minimum		2.00	
		Maximum		10.00	
		Range		8.00	
		Interquartile Range		2.75	
		Skewness		-.304	.208
		Kurtosis		-.135	.413

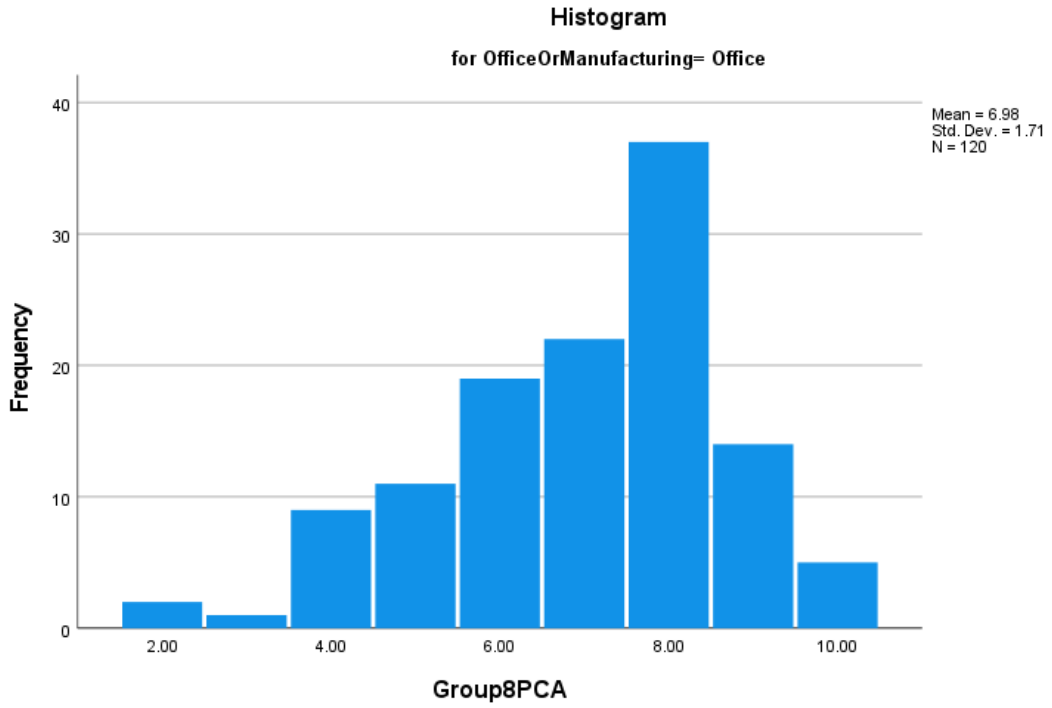
Tests of Normality

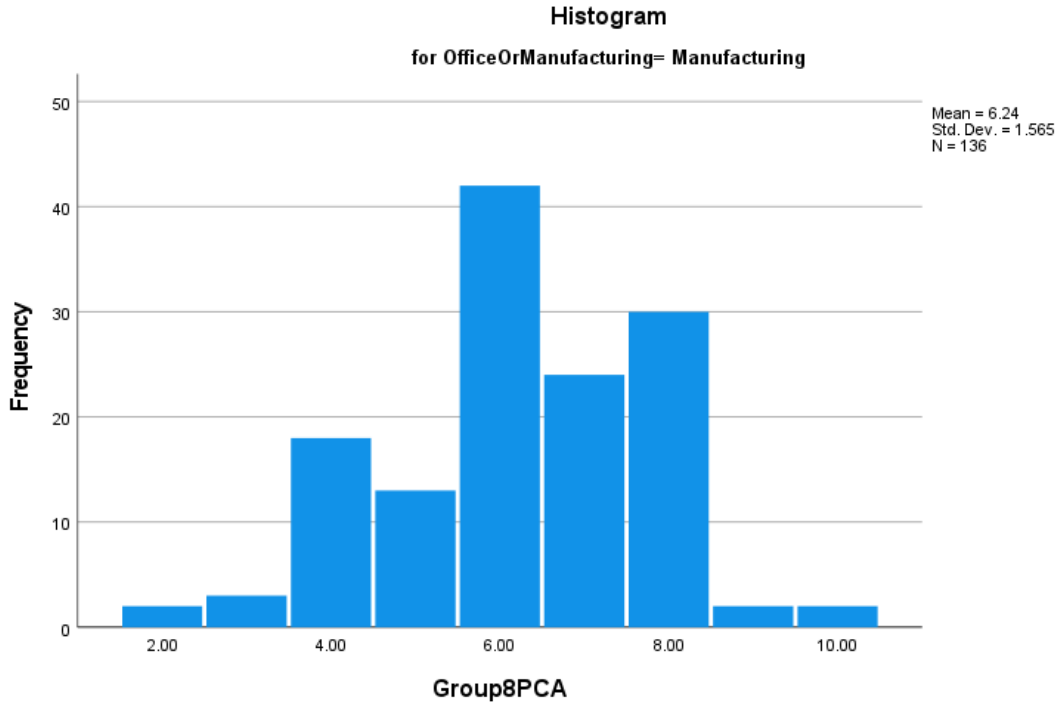
	What the building area is predominately used for	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Group8PCA	Office	.191	120	<.001	.936	120	<.001
	Manufacturing	.176	136	<.001	.941	136	<.001

a. Lilliefors Significance Correction

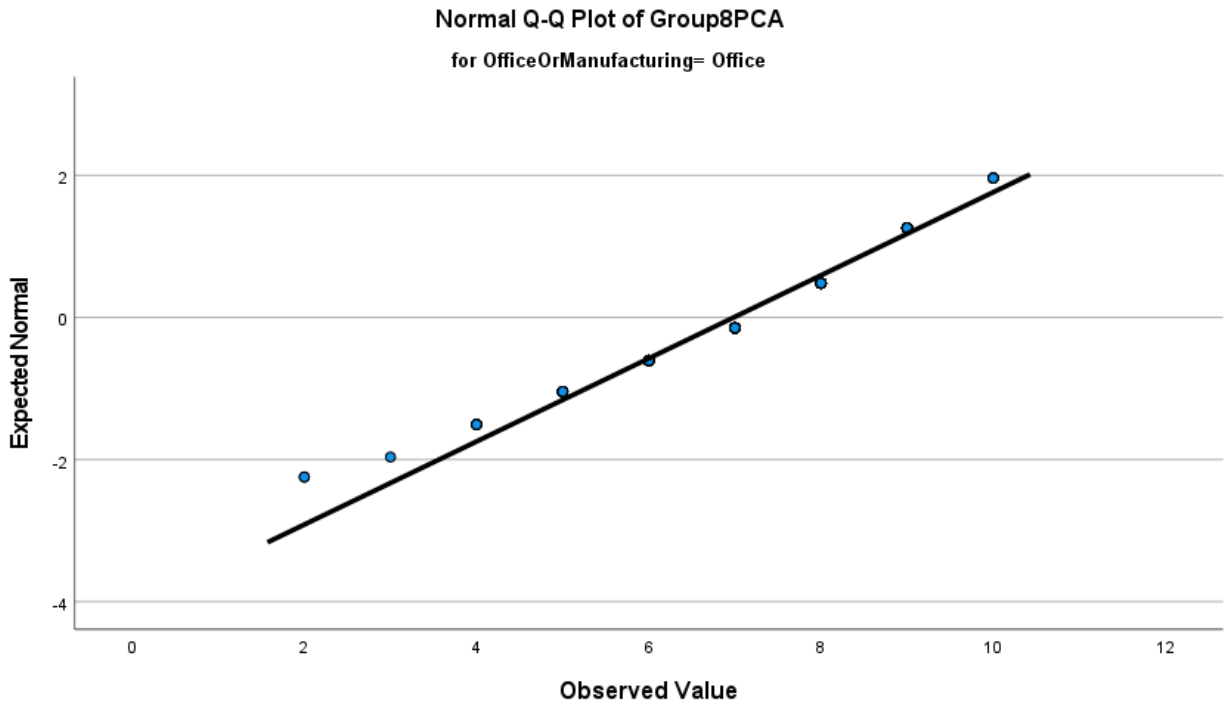
Group8PCA

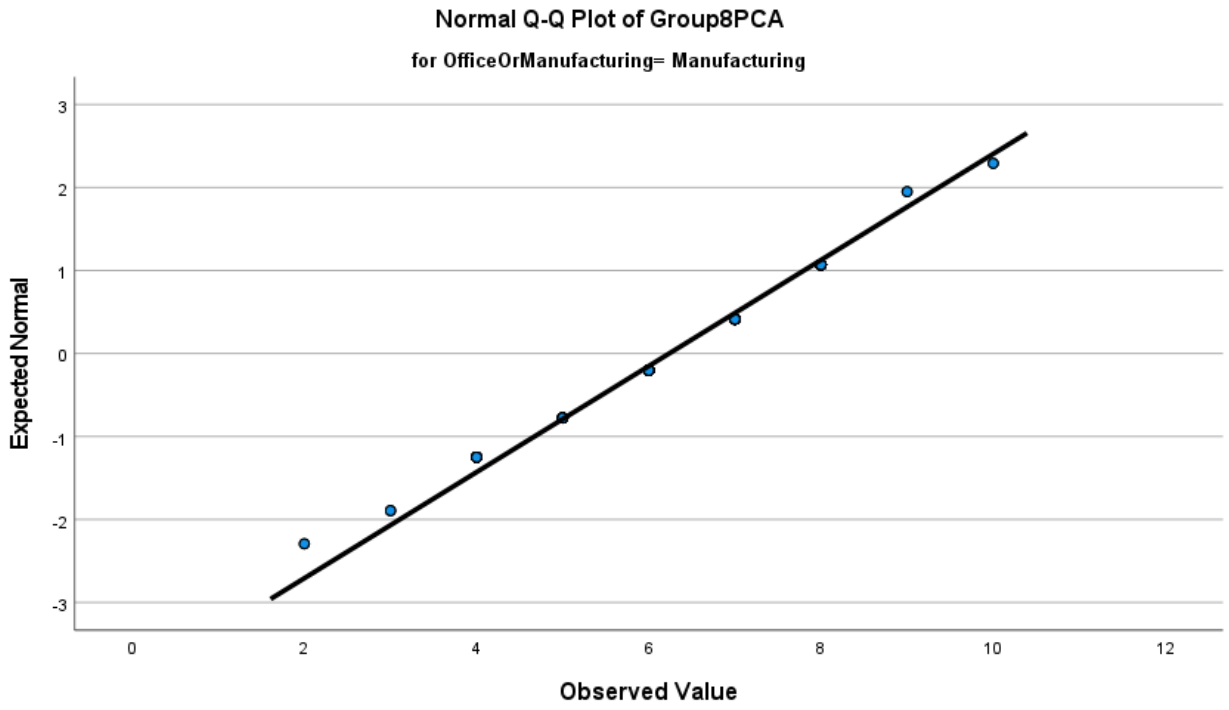
Histograms

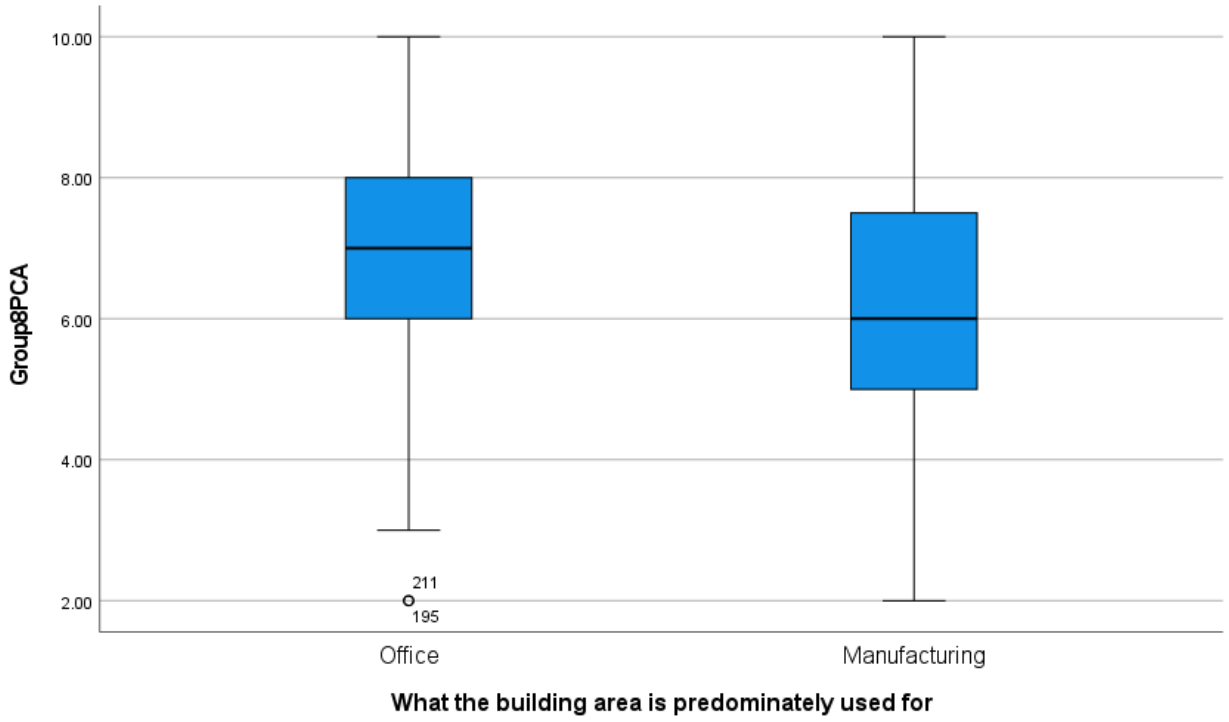




Normal Q-Q Plots


Normal Q-Q Plot of Group8PCA
for OfficeOrManufacturing= Office
Expected Normal
2
0
-2
-4
0
2
4
6
8
10
12
Observed Value


Normal Q-Q Plot of Group8PCA
for OfficeOrManufacturing= Manufacturing
Expected Normal
3
2
1
0
-1
-2
-3
0
2
4
6
8
10
12
Observed Value



T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group8PCA	Office	120	6.9833	1.71000	.15610
	Manufacturing	136	6.2353	1.56459	.13416

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
						Significance				95% Confidence Interval of the Difference
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group8PCA	Equal variances assumed	.853	.356	3.654	254	<.001	<.001	.74804	.20469	.34493	1.15115
	Equal variances not assumed			3.634	242.905	<.001	<.001	.74804	.20583	.34260	1.15348

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Group8PCA	Cohen's d	1.63432	.458	.209	.706
	Hedges' correction	1.63917	.456	.208	.704
	Glass's delta	1.56459	.478	.225	.729

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

The above identifes 211 and 195 as outliers
remove these and re-run test

What the building area is predominately used for

Case Processing Summary

	What the building area is predominately used for	Cases					
		Valid		Missing		Total	
		N	Percent	N	Percent	N	Percent
Group8PCA	Office	118	100.0%	0	0.0%	118	100.0%
	Manufacturing	136	100.0%	0	0.0%	136	100.0%

Descriptives

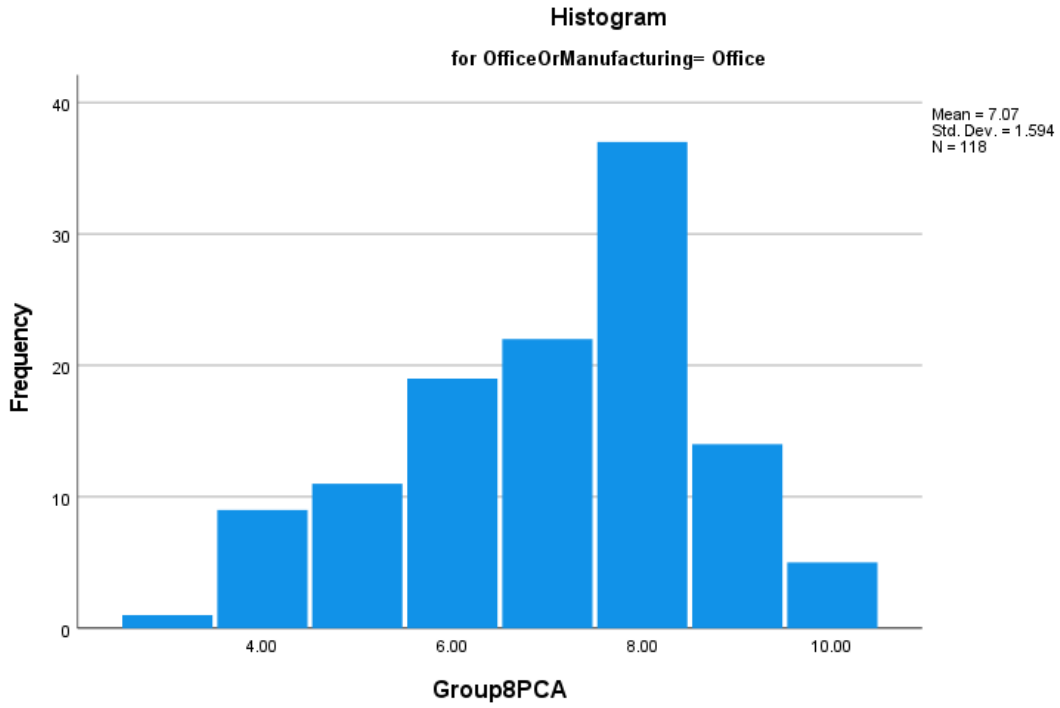
	What the building area is predominately used for			Statistic	Std. Error
Group8PCA	Office	Mean		7.0678	.14678
		95% Confidence Interval for Mean	Lower Bound	6.7771	
			Upper Bound	7.3585	
		5% Trimmed Mean		7.0932	
		Median		7.0000	
		Variance		2.542	
		Std. Deviation		1.59448	
		Minimum		3.00	
		Maximum		10.00	
		Range		7.00	
		Interquartile Range		2.00	
		Skewness		-.409	.223
		Kurtosis		-.449	.442
	Manufacturing	Mean		6.2353	.13416
		95% Confidence Interval for Mean	Lower Bound	5.9700	
			Upper Bound	6.5006	
		5% Trimmed Mean		6.2696	
		Median		6.0000	
		Variance		2.448	
		Std. Deviation		1.56459	
		Minimum		2.00	
		Maximum		10.00	
		Range		8.00	
		Interquartile Range		2.75	
		Skewness		-.304	.208
		Kurtosis		-.135	.413

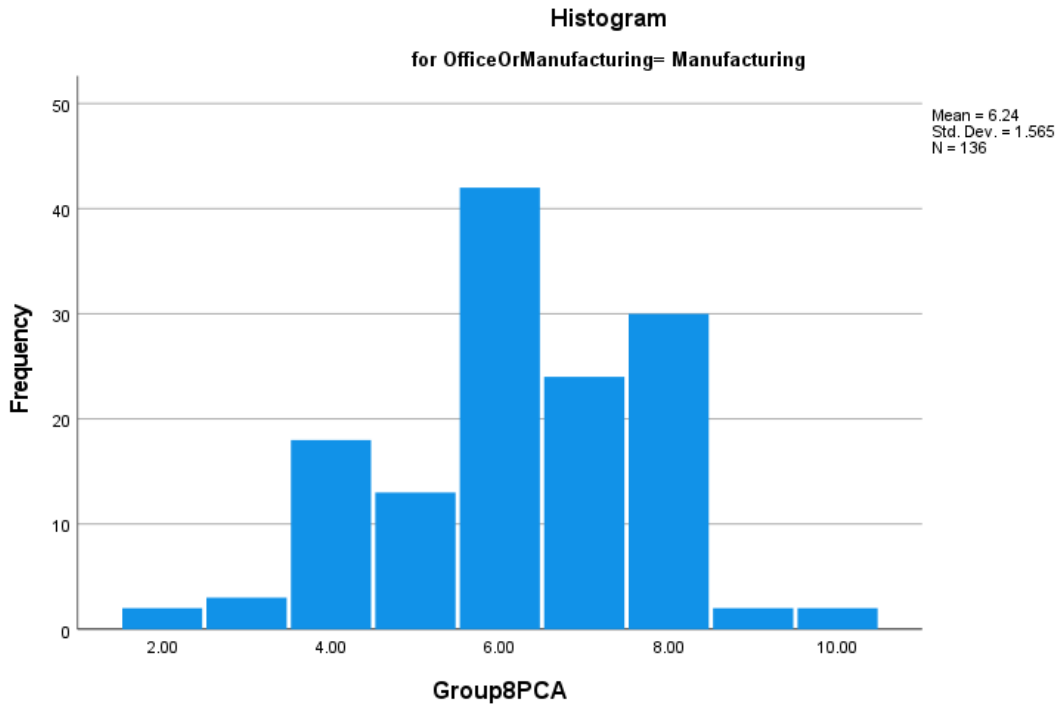
Tests of Normality

	What the building area is predominately used for	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Group8PCA	Office	.195	118	<.001	.939	118	<.001
	Manufacturing	.176	136	<.001	.941	136	<.001

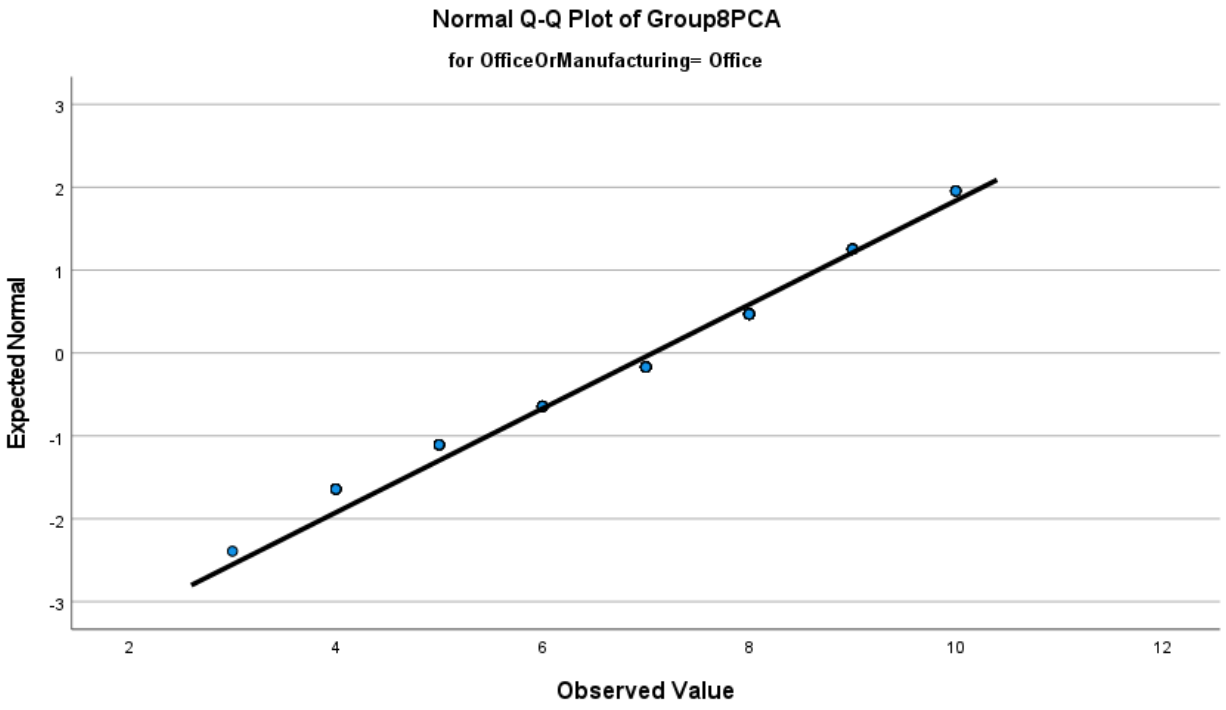
a. Lilliefors Significance Correction

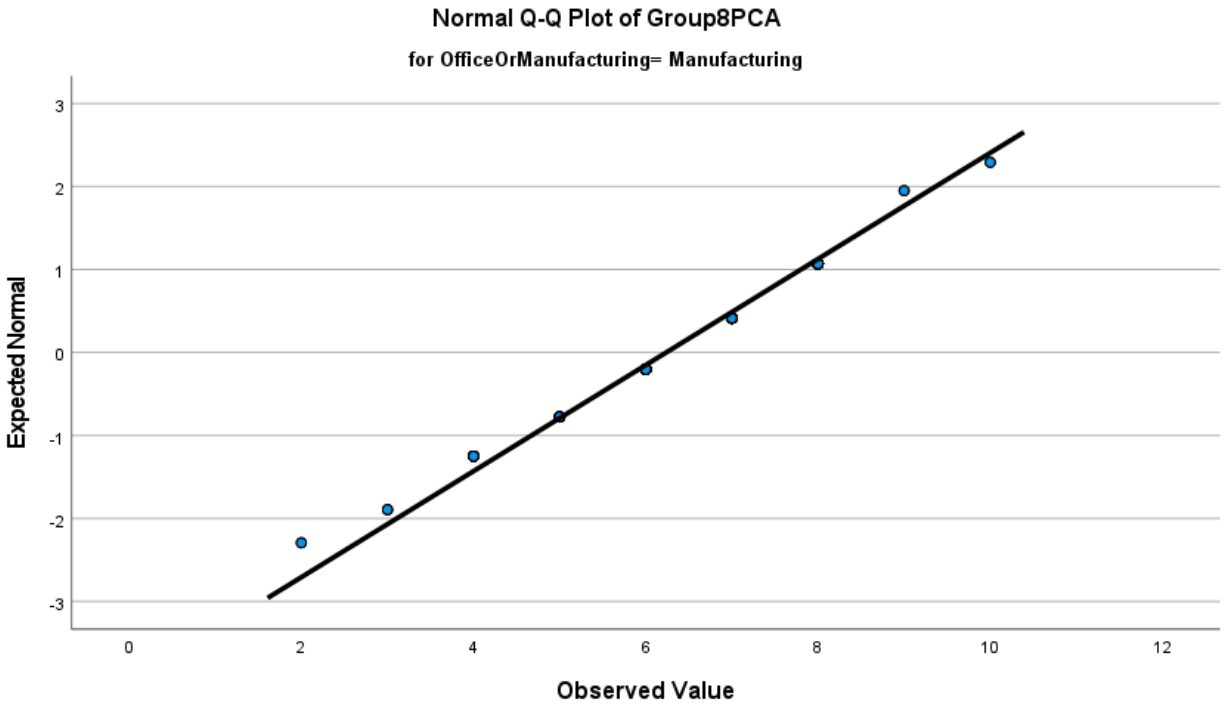
Histograms

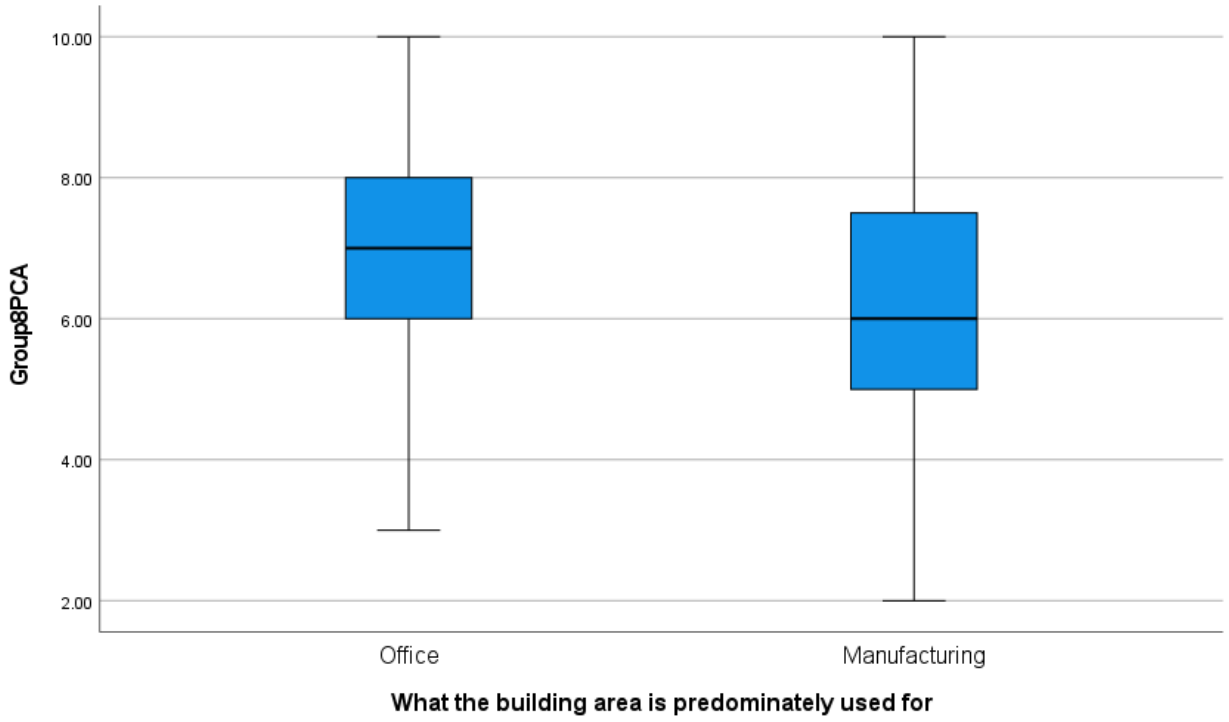




Normal Q-Q Plots


Normal Q-Q Plot of Group8PCA
for OfficeOrManufacturing= Office
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
2
4
6
8
10
12


Normal Q-Q Plot of Group8PCA
for OfficeOrManufacturing= Manufacturing
Expected Normal
Observed Value
3
2
1
0
-1
-2
-3
0
2
4
6
8
10
12



T-Test

Group Statistics

	What the building area is predominately used for	N	Mean	Std. Deviation	Std. Error Mean
Group8PCA	Office	118	7.0678	1.59448	.14678
	Manufacturing	136	6.2353	1.56459	.13416

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
						Significance				95% Confidence Interval of the Difference
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Group8PCA	Equal variances assumed	.187	.665	4.192	252	<.001	<.001	.83250	.19859	.44139	1.22361
	Equal variances not assumed			4.186	245.593	<.001	<.001	.83250	.19886	.44082	1.22419

Independent Samples Effect Sizes

		Standardizer[a]	Point Estimate	95% Confidence Interval	
				Lower	Upper
Group8PCA	Cohen's d	1.57854	.527	.276	.778
	Hedges' correction	1.58325	.526	.275	.775
	Glass's delta	1.56459	.532	.277	.786

a. The denominator used in estimating the effect sizes.

Cohen's d uses the pooled standard deviation.

Hedges' correction uses the pooled standard deviation, plus a correction factor.

Glass's delta uses the sample standard deviation of the control group.

```
There are no longer any outliers in the data
Shapiro-wilk is significant which suggests data is not normally distributed, confirmed by box and
whiskerplots and q-q plots.
Not appropriate to undertake independent t-test, explore other options such as mann-whitney test
```

Conducted non-parametric testing - Mann-Whitney U test on all groups. As the above results show, we only need to report the results for groups 2, 3, 5, 6, 7, and 8 as these groups violated the assumption of normality.

Prior to reporting the Mann-Whitney U test, inspect the frequency charts to ensure that the data from the two groups has similar distirbutions.

Nonparametric Tests Results

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of Group1PCA is the same across categories of What the building area is predominately used for.	Independent-Samples Mann-Whitney U Test	.034	Reject the null hypothesis.
2	The distribution of Group3PCA is the same across categories of What the building area is predominately used for.	Independent-Samples Mann-Whitney U Test	.128	Retain the null hypothesis.
3	The distribution of Group4PCA is the same across categories of What the building area is predominately used for.	Independent-Samples Mann-Whitney U Test	.675	Retain the null hypothesis.
4	The distribution of Group5PCA is the same across categories of What the building area is predominately used for.	Independent-Samples Mann-Whitney U Test	.041	Reject the null hypothesis.
5	The distribution of Group6PCA is the same across categories of What the building area is predominately used for.	Independent-Samples Mann-Whitney U Test	<.001	Reject the null hypothesis.
6	The distribution of Group7PCA is the same across categories of What the building area is predominately used for.	Independent-Samples Mann-Whitney U Test	<.001	Reject the null hypothesis.
7	The distribution of Group8PCA is the same across categories of What the building area is predominately used for.	Independent-Samples Mann-Whitney U Test	<.001	Reject the null hypothesis.
8	The distribution of Group2PCA is the same across categories of What the building area is predominately used for.	Independent-Samples Mann-Whitney U Test	<.001	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

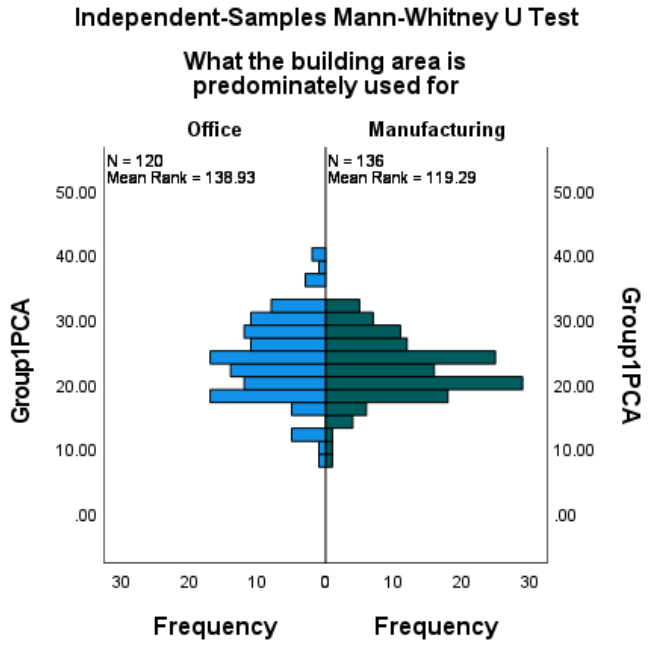
Independent-Samples Mann-Whitney U Test

Group1PCA across What the building area is predominately used for

Independent-Samples Mann-Whitney U Test Summary

Total N	256
Mann-Whitney U	6908.000

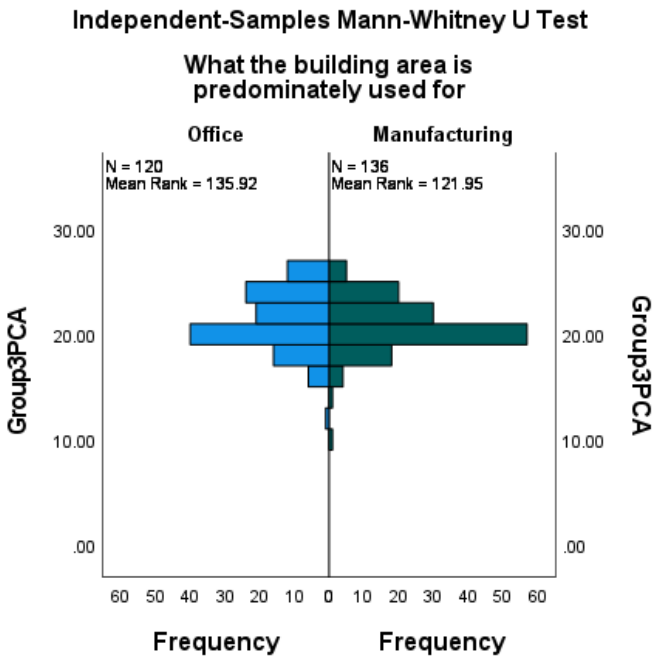
Wilcoxon W	16224.000
Test Statistic	6908.000
Standard Error	589.983
Standardized Test Statistic	-2.122
Asymptotic Sig.(2-sided test)	.034



Group3PCA across What the building area is predominately used for

Independent-Samples Mann-Whitney U Test Summary

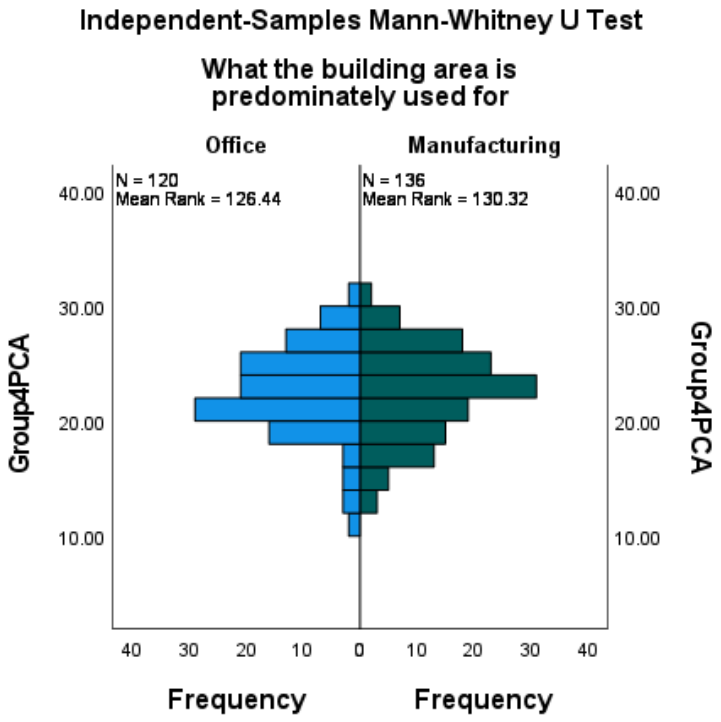
Total N	256
Mann-Whitney U	7269.500
Wilcoxon W	16585.500
Test Statistic	7269.500
Standard Error	585.463
Standardized Test Statistic	-1.521
Asymptotic Sig.(2-sided test)	.128



Group4PCA across What the building area is predominately used for

Independent-Samples Mann-Whitney U Test Summary

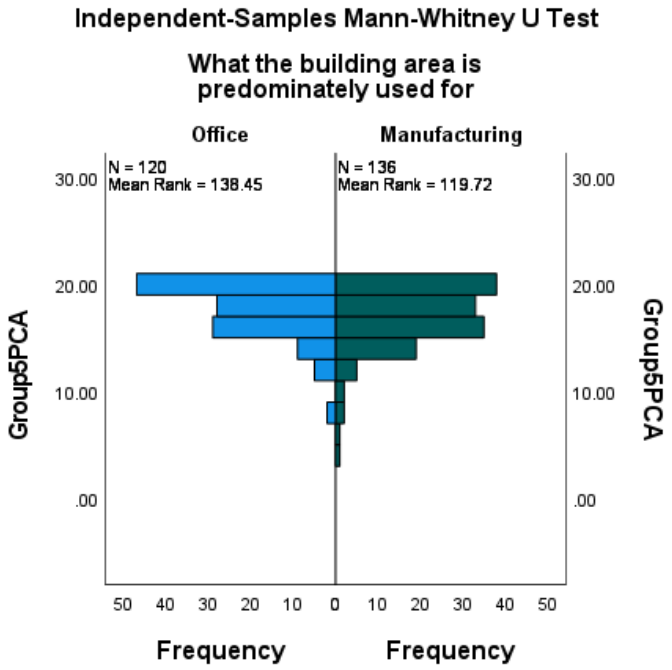
Total N	256
Mann-Whitney U	8407.000
Wilcoxon W	17723.000
Test Statistic	8407.000
Standard Error	589.349
Standardized Test Statistic	.419
Asymptotic Sig.(2-sided test)	.675



Group5PCA across What the building area is predominately used for

Independent-Samples Mann-Whitney U Test Summary

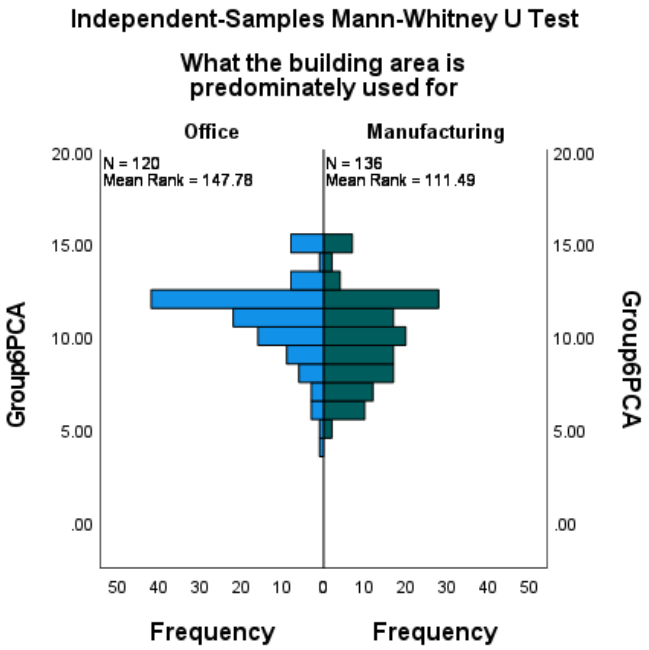
Total N	256
Mann-Whitney U	6966.000
Wilcoxon W	16282.000
Test Statistic	6966.000
Standard Error	584.472
Standardized Test Statistic	-2.043
Asymptotic Sig.(2-sided test)	.041



Group6PCA across What the building area is predominately used for

Independent-Samples Mann-Whitney U Test Summary

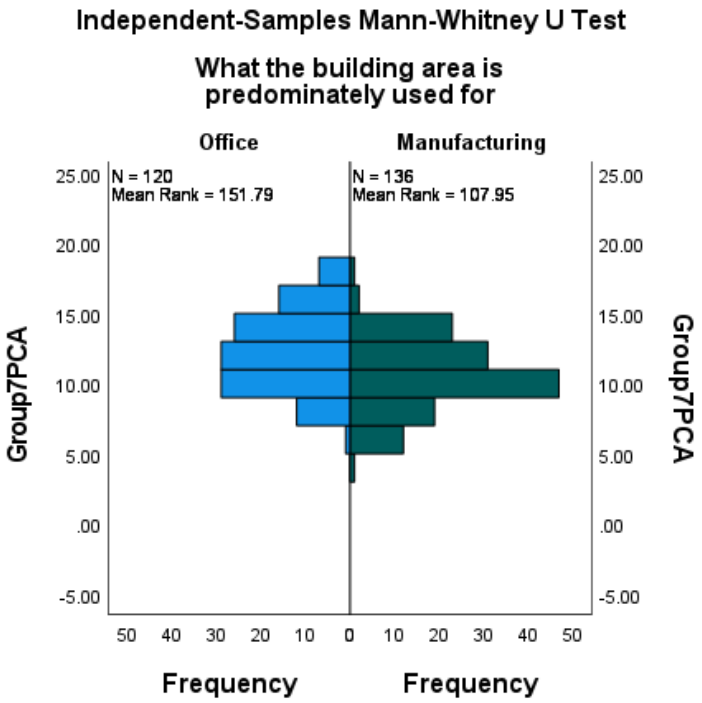
Total N	256
Mann-Whitney U	5846.500
Wilcoxon W	15162.500
Test Statistic	5846.500
Standard Error	582.519
Standardized Test Statistic	-3.972
Asymptotic Sig.(2-sided test)	<.001



Group7PCA across What the building area is predominately used for

Independent-Samples Mann-Whitney U Test Summary

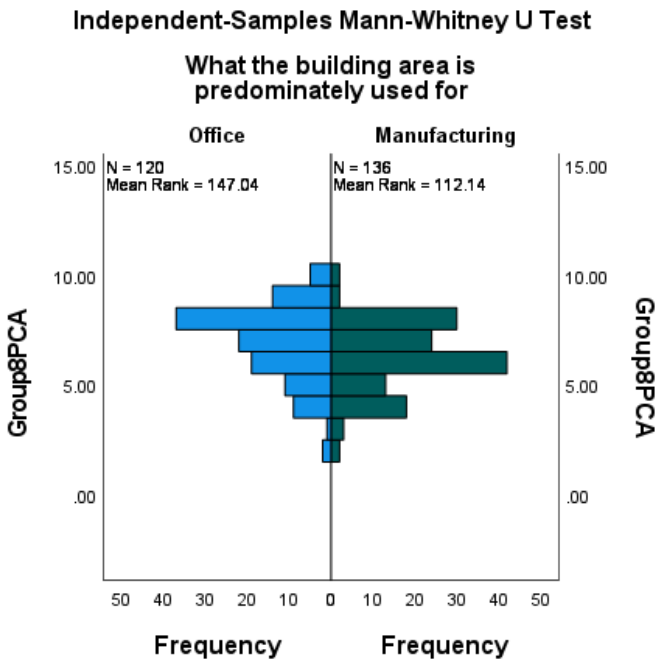
Total N	256
Mann-Whitney U	5365.000
Wilcoxon W	14681.000
Test Statistic	5365.000
Standard Error	587.442
Standardized Test Statistic	-4.758
Asymptotic Sig.(2-sided test)	<.001



Group8PCA across What the building area is predominately used for

Independent-Samples Mann-Whitney U Test Summary

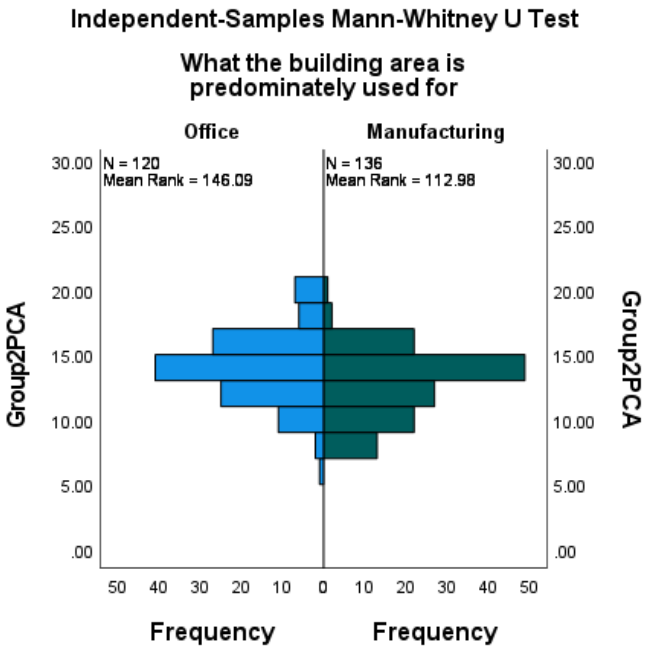
Total N	256
Mann-Whitney U	5935.000
Wilcoxon W	15251.000
Test Statistic	5935.000
Standard Error	579.405
Standardized Test Statistic	-3.840
Asymptotic Sig.(2-sided test)	<.001



Group2PCA across What the building area is predominately used for

Independent-Samples Mann-Whitney U Test Summary

Total N	256
Mann-Whitney U	6049.500
Wilcoxon W	15365.500
Test Statistic	6049.500
Standard Error	585.883
Standardized Test Statistic	-3.602
Asymptotic Sig.(2-sided test)	<.001


Independent-Samples Mann-Whitney U Test
What the building area is predominately used for
Office
Manufacturing
N = 120
Mean Rank = 146.09
N = 136
Mean Rank = 112.98
Group2PCA
Group2PCA
30.00
25.00
20.00
15.00
10.00
5.00
.00
50 40 30 20 10 0 10 20 30 40 50
Frequency
Frequency