SimplyDo Open Innovation Lean Six Sigma Project

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MADE L5 Continuous Improvement

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1. Report Introduction

The purpose of this report is illustrate how the process for open innovation engagement at SimplyDo can be taken through a Lean Six Sigma process to specifically Analyse the main contributing factors to any process inefficiencies, then improve and optimise the process using a data-driven evidence base. Before implementing any longer-term controls to ensure improvements are embedded within the organisation.

In order to provide a overview of the project thus far a simple slide deck is attached as Appendix 1 as an aid-memoir to the Define and Measure phases of this group project which also features a copy of the Project Charter. Additionally, initial findings of the Measure phase are captured in summary in Appendix 2 to provide a full account of this continuous improvement project.

2. Analyse

In order to provide an effective baseline of the problem a number of key variables were identified to illustrate both metrified gains within the process of engaging start-ups and SMEs in open innovation. In order to do this the project adopted the Poka-yoke concept to support identification of mistakes. (Bicheno and Holweg, 2016). This has been adapted to fit our standardised process for engaging organisations in open innovation.

Table 1. SimplyDo Open Innovation Engagement Poka-yoke

	Control	**Warning**
Contact	Manual Input Resource Time	Workload pressure demonstrated through weekly catch-ups
Fixed Value	Email Template Number of idea submissions	Spell Check Random Quality Checks KPIs not being met in advance of deadline
Motion Step	Email Action logged on spreadsheet	Weekly review and feedback

This short poka-yoke illustrates a number of potential mistakes that could occur during the existing process of open innovation engagement, but also how the existing proofing process illustrated in the warning column allows us to control and react to these potential mistakes. It should be noted critically that this approach is predominantly a reactive approach (Mital et al., 2008) with mistakes and bottlenecks

identified after the event, which is something that the Improve phase of this project will seek to address.

2.1 Which Inputs (Xs) affect my Outputs most (with data)?

Sampling methodology – sampling size

The number of cases or population (n) in this case was 55 which accurately represents the total population of users submitting ideas to our open innovation challenges within the Project Charter defined “Measure’ phase. This formed our accessible sample which provides a bridge between statistically robust probability sampling to more randomised and less robust non-probability samples (O’Dwyer and Bernauer, 2014).

What level of confidence do you have in your conclusions?

The statistical testing in this group project adopted a 95% confidence interval with SPSS testing as outlined in the summary tables below, which is in line with standard industry practice. Although it should be noted that the results of the analysis will only by 95% accurate across a broader population.

Statistical Analysis

In order to identify the inputs which effect the outputs, a number of key process points were mapped, (see Appendix 1: Value Stream Map). In order to establish the appropriate mean testing regime (parametric or non-parametric). In order to analyse this data a number of normality tests where performed on each input variable to establish the coherence of the sample and the normality of distribution of the data captured.

The following process input measures (y) were tested against projected normative mean populations as part of Kolmogorov-Smrinov statistical testing using SPSS. Full visualisations and descriptive statistical outputs are included in Appendix 2 for reference.

1) Difference (measured in days) between Emailed and Submitted
2) Difference (measured in days) between Emailed and Last Seen
3) Average Time Spent on the Activity
4) Number of personal engagement contacts (phone calls)

The results for each of the variables are included using SPSS in the relevant Figure’s on the following pages.

Figure 1: Case Processing Summary

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Number_of_Phone_Calls	55	87.3%	8	12.7%	63	100.0%
Difference_Between_Emailed_and_Submitted	55	87.3%	8	12.7%	63	100.0%
Difference_Between_Emailed_and_Last_Seen	55	87.3%	8	12.7%	63	100.0%
Time_Spent_on_Activity_MINS_HRS	55	87.3%	8	12.7%	63	100.0%

The missing cases are present due to the availability of data for submissions were accurate email data was not captured. This could be due to referrals from another customer/supplier.

Figure 2. Analyse Descriptive Statistics

Descriptives

			Statistic	Std. Error
Number_of_Phone_Calls	Mean		1.8364	.05034
	95% Confidence Interval for Mean	Lower Bound	1.7354	
		Upper Bound	1.9373	
	5% Trimmed Mean		1.8737	
	Median		2.0000	
	Variance		.139	
	Std. Deviation		.37335	
	Minimum		1.00	
	Maximum		2.00	
	Range		1.00	
	Interquartile Range		.00	
	Skewness		-1.870	.322
	Kurtosis		1.551	.634
Difference_Between_Emailed_and_Submitted	Mean		16.80	1.452
	95% Confidence Interval for Mean	Lower Bound	13.89	
		Upper Bound	19.71	
	5% Trimmed Mean		15.49	
	Median		13.00	
	Variance		115.978	
	Std. Deviation		10.769	
	Minimum		6	
	Maximum		56	
	Range		50	
	Interquartile Range		11	
	Skewness		1.814	.322
	Kurtosis		3.779	.634
Difference_Between_Emailed_and_Last_Seen	Mean		15.95	3.170
	95% Confidence Interval for Mean	Lower Bound	9.59	
		Upper Bound	22.30	
	5% Trimmed Mean		12.80	
	Median		11.00	
	Variance		552.571	
	Std. Deviation		23.507	
	Minimum		0	
	Maximum		155	
	Range		155	
	Interquartile Range		16	
	Skewness		4.113	.322
	Kurtosis		22.579	.634
Time_Spent_on_Activity_MINS_HRS	Mean		1.6620	.08276
	95% Confidence Interval for Mean	Lower Bound	1.4961	
		Upper Bound	1.8279	
	5% Trimmed Mean		1.6100	
	Median		1.4600	
	Variance		.377	
	Std. Deviation		.61377	
	Minimum		1.10	
	Maximum		3.16	
	Range		2.06	
	Interquartile Range		1.01	
	Skewness		1.171	.322
	Kurtosis		.848	.634

Figure 3. Analyse Test for Normality

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Number_of_Phone_Calls	.506	55	<.001	.446	55	<.001
Difference_Between_Emailed_and_Submitted	.165	55	<.001	.817	55	<.001
Difference_Between_Emailed_and_Last_Seen	.249	55	<.001	.599	55	<.001
Time_Spent_on_Activity_MINS_HRS	.211	55	<.001	.808	55	<.001

a. Lilliefors Significance Correction

Tests for normality in comparison to a predicted wider population illustrate the non-normative profile of the data expressed through the Kolmogorov-Smrinov value of p=<00.1. This could be due to the relatively small sample population. The non-normative nature of the distribution of means for this population illustrates that this report will need to perform non-parametric testing using the Central Limit Theorum to compare means to conclude the Analyse phase.

Comparative Means Testing

The correlation between the identified area of improvement, which was identified as the effectiveness of the 'Time spent on the activity' in relation to the 'idea being submitted' is a key performance measure and an efficiency that this Lean Six Sigma project seeks to reduce. The importance of these variables was identified through both voice-of-the-customer and voice-of-the-product in the Define and Measure phases. This variable also directly relates to cost and spend on staff time, so illustrates a business case for change and the need to implement measures in the Control phase of the project.

In order to establish an inferred relationships between these variables, and which Challenge has the most effective approach to benchmark against in the Improve phase, a Independent K Sample Test was performed to establish significant difference in means between the input variables (emails sent, number of engagement calls, time taken to submit the ideas) and our key output variable which is the 'amount of time spent on the activity'. These means are compared to identify significant difference (p=<0.05) between the inputs across the activity.

Figure 4. Analyse Summary Tables

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
ANALYSE_Difference_Between_Emailed_and_Submitted	59	17.36	10.748	6	56
ANALYSE_Difference_Between_Emailed_and_Last_Seen	58	16.17	22.926	0	155
ANALSE_Time_Spent_on_Activity_MINS_HRS	59	1.6785	.62950	1.10	3.16
ANALSE_Number_of_Phone_Calls	59	1.8475	.36263	1.00	2.00
Grouping_Sample	59	1.81	.937	1	3

The Kruskai-Wallis H calculation to test and understand how each of the challenges differs in terms of means across the variables.

Figure 5. Kruskal-Wallis Test

Test Statistics[a,f]

	ANALYSE_Difference_Between_Emailed_and_Submitted	ANALYSE_Difference_Between_Emailed_and_Last_Seen	ANALSE_Time_Spent_on_Activity_MINS_HRS	ANALSE_Number_of_Phone_Calls
N	59	58	59	55
Median	15.00	13.00	1.4600	2.0000[e]
Chi-Square	3.966[b]	7.628[c]	27.389[d]	
df	2	2	2	
Asymp. Sig.	.138	.022	<.001	

a. Grouping Variable: Grouping_Sample

b. 2 cells (33.3%) have expected frequencies less than 5. The minimum expected cell frequency is 2.9.

c. 2 cells (33.3%) have expected frequencies less than 5. The minimum expected cell frequency is 3.0.

d. 2 cells (33.3%) have expected frequencies less than 5. The minimum expected cell frequency is 2.5.

e. All values are less than or equal to the median. Median Test cannot be performed.

f. There are not enough valid cases to perform the Median Test for ANALSE_Number_of_Phone_Calls * Grouping_Sample (Analyse Sample - Challenge 1, Analyse Sample - Challenge 3). No statistics are computed.

Although the table above does through the Asmp.Sig values (p) illustrate significant difference between the variables of Difference Between Emailed and Last Seen (p=0.22) and Time Spent on Activity (p=<.001) this statistical test does not outline

which the relational difference between the variables. However reviewing the Mean ranks does illustrate some interesting efficiencies across the three open innovation challenges run across the Measure phase.

Figure 6. Analyse Mean Ranks

Ranks

	Grouping_Sample	N	Mean Rank
ANALYSE_Difference_Between_Emailed_and_Submitted	Analyse Sample - Challenge 1	32	31.94
	Analyse Sample - Challenge 2	6	17.58
	Analyse Sample - Challenge 3	21	30.60
	Total	59	
ANALYSE_Difference_Between_Emailed_and_Last_Seen	Analyse Sample - Challenge 1	31	24.94
	Analyse Sample - Challenge 2	6	44.33
	Analyse Sample - Challenge 3	21	32.00
	Total	58	
ANALSE_Time_Spent_on_Activity_MINS_HRS	Analyse Sample - Challenge 1	32	37.50
	Analyse Sample - Challenge 2	6	56.50
	Analyse Sample - Challenge 3	21	11.00
	Total	59	
ANALSE_Number_of_Phone_Calls	Analyse Sample - Challenge 1	30	27.92
	Analyse Sample - Challenge 2	5	27.00
	Analyse Sample - Challenge 3	20	28.38
	Total	55	

The mean ranks illustrate that Challenge 2 featured the lowest mean value (17.58) in the Difference Between Emailed and Submitted which we can infer illustrates that this was the most effective in terms of organisations receiving an email and submitting an idea through the SimplyDo platform. However, when reviewing the 'Time Spent on Activity' illustrates the highest mean value (56.60). We can infer from this that in order to improve efficiency between the number of emails sent leading to idea submissions that the organisation needs to spend more time, per challenge, on

this activity. The intended outcome of this project is that both the time between Emailed and Submitted reduces and the Time Spent on Activity is reduced.

The significance of the measurement of the average time spent on the activity is a key performance indicator for the process as the less time and resultant overhead cost associated to the activity means increases in efficiency and increased profitability.
The significance of the measurement of the average time spent on the activity is a key performance indicator for the process as the less time and resultant overhead cost associated to the activity means increases in efficiency and increased profitability.

It should be noted at this point that the variable captured around the difference between Emailed and user's last log-in to the platform was a not a reliable indicator of business value for the organisation and so has been deprioritised in terms of comparative analysis in the Improve Phase. It was decided internally by group project participants that the data is not actually relevant to the actual process of engagement leading to idea submission, which is because it only illustrates a user logging-in, rather than submitting which leads to contract fulfilment.

3. Improve Phase

In order to gain efficiencies across the key variables of "time spent on the activity' and the amount of time between 'emailed and idea submitted' variables, It was decided to try and instigate a more automated workflow using the Hubspot Customer Relationship Management (CRM) system. In order to to create these improvement variables the team undertook a brainstorming and scoring session, adopting the 5 Whys (Bicheno and Holweg, 2016) mechanism with a summary table of ranking of these improvement features included below.

Table 2. SimplyDo 5 Whys Brainstorming Outputs

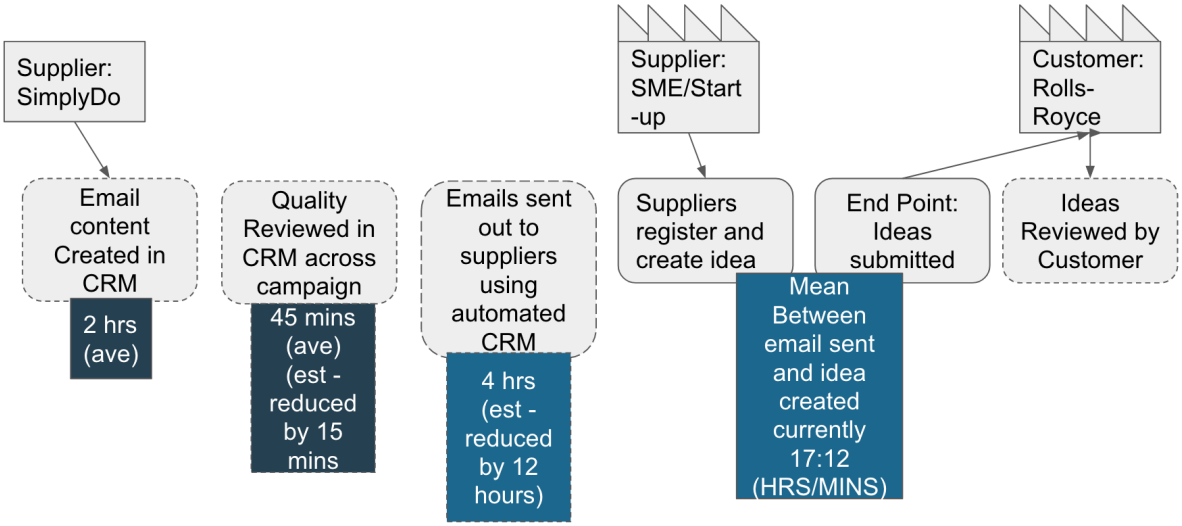
Improvement Opportunity	Description	Source of Improvement	Stage of the Process	Potential Benefits	Potential Disbenefits
Use automated CRM to distribute coms	Implement HubSpot to handle comms sequences and m	VoP	Email Content Created	Staff time saved and quality improved	Cost of implementation
Perform quality checks within CRM	Comms can be checked and edited centrally	VoP	Quality Review	Centrally used system time saved on editing and redrafting documents. Ch	Cost of implementation
Quality control review after email 1 sent	Review email comms and response at first stage gate	VoC	Quality Review	Catches more issues up front allows us to react to changes in the campaig	Will only capture mistak
Increase number of submitting organisations	Drive engagement through more correspondence and better sequencing of comms	VoC	Suppliers register and create idea	Less chance of contract failure	More time and therefor
Change email format on challenge by challenge basis	Create bespoke correspondence to drive engagement	VoC	Emails sent out to suppliers	Should drive better engagement	Time spent on the activ
Go through LinkedIn	Use LinkedIn as the primary contact source	VoP	Email sent out to suppliers	Quicker route to contacting key stakeholders	Time and authenticity o
Buy a marketing database and contacts	Use third party database built with quality contacts to in	VoP	Email Content Created	Time saved on finding and contacting key stakeholders	Cost
Just telephone companies	Replace email comms with more telephone contact	VoC	Email sent out to suppliers	Personalised contact may lead to more ideas	Time spent on the activ
Partner with outreach provider	Outsource work and base on targets	VoP	Emails sent out to suppliers	Outsourcing will reduce staff time on the activity, may also drive up quality	Cost
Use Project Board by default to manage top 20 contacts	Default filter contactys on the board that are assigned to the staff member when the enter the project board via an assignment token.	VoC	Emails sent out to suppliers	Transparent and trackable through existing inhouse system	Limited ability to handle
New email html format	Redesign to more visually appealing	VoC	Email Content Created	Better engagement	Cost of redesign
Offer financial incentives for applications	Offer Amazon voucher as reward for submitting	VoP	Suppliers register and create idea	Drives completions as they are directly incentivised	Cost and ethical influen
Align task to date	Checklist format stored in Trello	VoC	Quality Review	More accountability and better outcomes	Extends time spent on

WHY: Relevance to Project Charter (Where 10 = Extremely Relevant)	WHY: Ease of Implementation (Where 10 = Very Easy)	WHY: Significance of Impact (Where 10 = Very Significant)	Average Score
10	7	10	9
10	7	8	8.333333333
6	10	6	7.333333333
8	6	7	7
8	5	6	6.333333333
7	7	5	6.333333333
7	5	7	6.333333333
6	4	8	6
7	5	5	5.666666667
4	8	4	5.333333333
6	5	5	5.333333333
4	6	5	5
4	5	4	4.333333333

This change in process to using an automated CRM system offers several benefits to the process including the automation of manual tasks involving the distribution of emails which would typically be completed by several individuals using a basic version of mail merge. This also allows us to set up an email campaign and perform quality checks before the correspondence is sent out, rather than reacting to problems or corrections after send out. It also provides greater visibility to the task as multiple persons can review the correspondence and dates are scheduled for correspondence to be sent out. Rather than the more adhoc process that was present in the Define and Measure phases of this project.

To visualise this process change and illustrate the intended improvement areas, a new process map has been created evidencing the intervention of the CRM system in the process indicated by the dotted lines around the process areas and estimated time spent on the activity.

Figure 7 . Future State Value Stream Map



The major additions to this value stream map are the projected reduced time across the Quality Review process created by the ability to review and edit correspondence centrally and the major saving in when the emails are actually sent out. This is due to the HubSpot CRM replacing a manual mail merge that would occur 4 times during each challenge. This should then lead to a reduction in the mean of staff time spent

on the activity and the mean of the time between the email being sent and the idea created.

This future state value stream map will now be tested statistically to ensure that the inputs in terms of the adoption of the HubSpot CRM system have evidentially improved efficiencies and led to quality improvement.

What is the optimal Y=f(X) solution (Y = (Function f) Output X): Statistical Testing

This element of the improve phase will present data captured when the Future State Value Stream Map had been implemented and used for two recent challenges with the same client. It should be noted that due to the timescale and number of challenges completed over this phase of the project that the sample size remains relatively small (n=39).

As with previous testing, normality of distribution was testing using the Kolmogorov-Smirnov test for normal distribution within the Improve population. A summary table is produced below.

Figure 8. Improve Normality Test Summary Table

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference_between_Emailed_and_Submitted	.157	39	.016	.923	39	.011
Difference_between_Emailed_and_Last_Seen	.179	39	.003	.847	39	<.001
Average_Time_Spent_on_Activity	.371	39	<.001	.631	39	<.001
Number_of_Phone_Calls	.358	39	<.001	.635	39	<.001

a. Lilliefors Significance Correction

As the p value remains <0.05 then we can conclude that data is not normally distributed for all of the variables apart from Difference between Emailed and Submitted (p=.016). This may be due to the relatively small sample size and any conclusions about wider population will be difficult to draw without more sample data as the Lean Six Sigma project continues to be operationalised. I have also replicated this test for normality across the total sample population (i.e Analyse and Improve phases) just to reaffirm the abnormal distribution of this sample population.

Figure 9. Combine Analyse and Improve Tests for Normality Summary Table

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference_Between_Emailed_and_Submitted	.162	94	<.001	.892	94	<.001
Difference_Between_Emailed_and_Last_Seen	.235	94	<.001	.639	94	<.001
Time_Spent_on_Activity_MINS_HRS	.223	94	<.001	.860	94	<.001
Number_of_Phone_Calls	.449	94	<.001	.567	94	<.001

a. Lilliefors Significance Correction

Number of trials

In order to illustrate the improvement to the process and potential future cost savings the trials were completed over a two month period incorporating two challenges with 39 ideas submitted. While this number of trials is not equal to the data set captured as part of the measure phase it does provide a useful indication of future reduction in terms of costs and overheads.

Comparison of Means

This project report will now compare the mean values captured during the Analyse phase against the mean values captured in the Improve phase using a Two Sample K Test using a Mann-Whitney U calculation.

Figure 10. Analyse Descriptive Statistics

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
ANALYSE_Difference_Between_Emailed_and_Submitted	59	17.36	10.748	6	56
ANALYSE_Difference_Between_Emailed_and_Last_Seen	58	16.17	22.926	0	155
ANALSE_Time_Spent_on_Activity_MINS_HRS	59	1.6785	.62950	1.10	3.16
ANALSE_Number_of_Phone_Calls	59	1.8475	.36263	1.00	2.00
Grouping_Sample	59	1.81	.937	1	3

Figure 11. Improve Descriptive Statistics

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Difference_between_Emailed_and_Submitted	40	16.00	9.918	2	36
Difference_between_Emailed_and_Last_Seen	41	12.02	13.114	0	59
Average_Time_Spent_on_Activity	40	.3640	.06046	.31	.43
Number_of_Phone_Calls	39	1.5385	.50504	1.00	2.00
Grouping_Variable	40	7.05	11.152	4	55

Comparatively between the two phases of the project we see reductions in both the mean and standard deviation across the variables illustrating the improvements made by the implementation of the CRM system to handle this particular activity and drive both quality and improvement into the process.

Figure 12. Combined Analyse and Improve Mean Ranks

Ranks

	Analyse_Improve_Grouping	N	Mean Rank	Sum of Ranks
Difference_Between_Emailed_and_Submitted	ANALYSE	59	50.99	3008.50
	IMPROVE	40	48.54	1941.50
	Total	99		
Difference_Between_Emailed_and_Last_Seen	ANALYSE	58	51.27	2973.50
	IMPROVE	40	46.94	1877.50
	Total	98		
Time_Spent_on_Activity_MINS_HRS	ANALYSE	59	70.00	4130.00
	IMPROVE	40	20.50	820.00
	Total	99		
Number_of_Phone_Calls	ANALYSE	55	53.31	2932.00
	IMPROVE	39	39.31	1533.00
	Total	94		

It is useful to compare the variable mean ranking between the Analyse and Improve phase as this shows a distinct reduction in mean time spent on the activity across all variables.

Figure 13. Mann-Whitney U Summary Table

Test Statistics[a]

	Difference_between_Emailed_and_Submitted	Difference_between_Emailed_and_Last_Seen	Average_Time_Spent_on_Activity	Number_of_Phone_Calls
Mann-Whitney U	78.000	120.500	.000	166.500
Wilcoxon W	288.000	330.500	210.000	319.500
Z	-2.991	-1.762	-6.083	-.124
Asymp. Sig. (2-tailed)	.003	.078	<.001	.902
Exact Sig. [2*(1-tailed Sig.)]	.002[b]	.082[b]	<.001[b]	.916[b]

a. Grouping Variable: Grouping_Variable

b. Not corrected for ties.

The test statistics reaffirms there is a significant difference between the Analyse and Improve groups in respect of the Difference between Emailed and Submitted with (p=.002), and Average Time Spent on the Activity (p=<.001).

In order to further evidence this relationship between the two variables a correlation statistical test was performed using the Spearman Co-efficient as this is the non-parametric equivalent of the Pearson calculation. Outputs are included below.

Figure 14. Spearman Co-efficient Correlation Summary Table

Correlations

			Difference_between_Emailed_and_Submitted	Average_Time_Spent_on_Activity
Spearman's rho	Difference_between_Emailed_and_Submitted	Correlation Coefficient	1.000	.463**
		Sig. (2-tailed)	.	.003
		N	40	40
	Average_Time_Spent_on_Activity	Correlation Coefficient	.463**	1.000
		Sig. (2-tailed)	.003	.
		N	40	40

**. Correlation is significant at the 0.01 level (2-tailed).

A Spearman's rank-order correlation was run to determine the relationship between the time between ‘Emailed and Submittin’g an idea and the ‘Average Time Spent on the Activity’. There was a strong, positive correlation between the two variables, which was statistically significant (rs) = .463, p = .003). The other input variables were test using this correlation with no significant differences noted.

Returning to the Lean Six Sigma formulae, we have established that the Y= (f) x for this project is:

Y = Number of ideas submitted
F = Difference between Emailed and Submitted (Improve Phase) variable
X = Average Time Spent on the Activity Emailed and Submitted Variable

What is the work plan to implement and validate the solution?

The SimplyDo team will continue to use the automated CRM system for contacting and engaging suppliers for the next six months with data-driven review at calendar year end. This will allow us to enlarge the sample size to a roughly equivalent as the Analyse phase and re-run the statistical testing to ensure the trends identified are standardised across a longer period of time. This element of the work will deploy the Design of Experiments (Fisher, 1926) methodology to ensure that we test multiple factors as the improvement project continues.

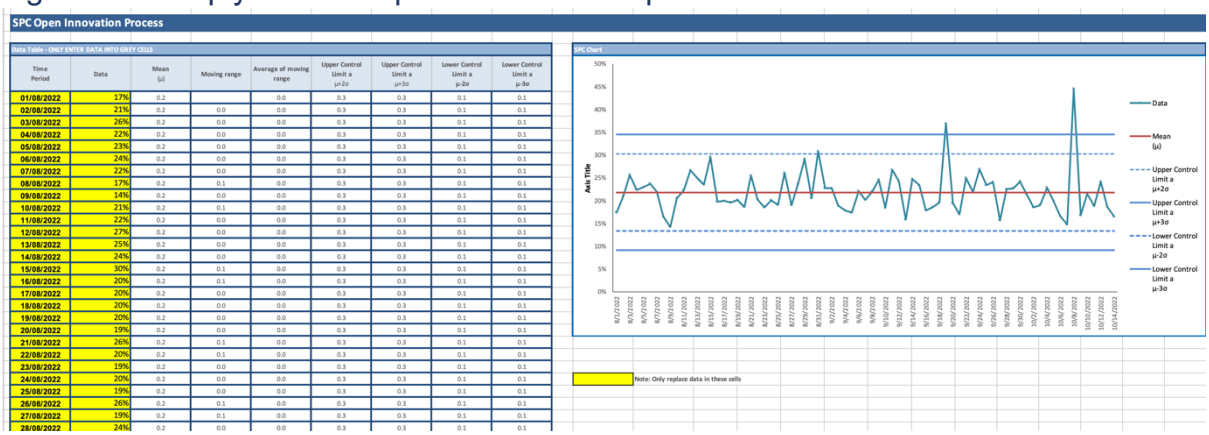
4. Control Phase

Can you demonstrate the improvement is sustainable over time?

The current improvement project has been established over the last two months of the project with notable success both statistically and anecdotally with the number of idea submissions rising to over 20 per challenge. This means that all important cultural buy-in from the project team has been retained.

In order to support the both measurement and sustainable improvement across open innovation projects we have implemented a Statistical Process Control (Taghizadegan, 2006) Open Innovation Process spreadsheet and visualisation to provide top-level management reporting. The monthly reporting regime has been established

Figure 15. SimplyDo SPC Spreadsheet Example



SPC Open Innovation Process

Data Table - ONLY ENTER DATA INTO GREY CELLS

Time Period	Data	Mean (μ)	Moving range	Average of moving range	Upper Control Limit a μ+2σ	Upper Control Limit a μ+3σ	Lower Control Limit a μ-2σ	Lower Control Limit a μ-3σ
01/08/2022	17%	0.2		0.0	0.3	0.3	0.1	0.1
02/08/2022	21%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
03/08/2022	26%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
04/08/2022	22%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
05/08/2022	23%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
06/08/2022	24%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
07/08/2022	22%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
08/08/2022	17%	0.2	0.1	0.0	0.3	0.3	0.1	0.1
09/08/2022	14%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
10/08/2022	21%	0.2	0.1	0.0	0.3	0.3	0.1	0.1
11/08/2022	22%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
12/08/2022	27%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
13/08/2022	25%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
14/08/2022	24%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
15/08/2022	30%	0.2	0.1	0.0	0.3	0.3	0.1	0.1
16/08/2022	20%	0.2	0.1	0.0	0.3	0.3	0.1	0.1
17/08/2022	20%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
18/08/2022	20%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
19/08/2022	20%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
20/08/2022	19%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
21/08/2022	26%	0.2	0.1	0.0	0.3	0.3	0.1	0.1
22/08/2022	20%	0.2	0.1	0.0	0.3	0.3	0.1	0.1
23/08/2022	19%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
24/08/2022	20%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
25/08/2022	19%	0.2	0.0	0.0	0.3	0.3	0.1	0.1
26/08/2022	26%	0.2	0.1	0.0	0.3	0.3	0.1	0.1
27/08/2022	19%	0.2	0.1	0.0	0.3	0.3	0.1	0.1
28/08/2022	24%	0.2	0.0	0.0	0.3	0.3	0.1	0.1

This is also supported by underpinning changes to the process described in the Future State Value Stream Map, and we have also altered our Open Innovation Playbook to ensure that new starters or existing staff who are working on the open innovation process are aligned with the use of the CRM system and the quality review process.

Is the process in control?

In order to control the process beyond the SPC process outlined above, SimplyDo have also instituted a Failure Mode and Effect Analysis approach to managing risk within these particularly high-profile projects.

This has involved conducting a FMEA on each stage of the open innovation engagement process (Bicheno and Holweg, 2016). In order to illustrate this control element, I have included a completed example below which is being used currently for a challenge that is launching in early September.

Table 3. SimplyDo Open Innovation FMEA Worksheet

Open Innovation FMEA Worksheet

Protection:The spreadsheets are not protected or locked.

System	Open Innovation	**Potential Failure Mode and Effects Analysis (Design FMEA)**		FMEA Number	1
Subsystem	EmailContact			Prepared By	john Barker
Component	CRM			FMEA Date	01/09/2022
Project Lead	John Barker	Key Date		Revision Date	01/08/2022
Core Team	Boyan Dimitrov/Clair Pettheram			Page	1 of 1

											Action Results				
Item / Function	Potential Failure Mode(s)	Potential Effect(s) of Failure	Sev	Potential Cause(s)/ Mechanism(s) of Failure	Prob	Current Design Controls	Det	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	New Sev	New Occ	New Det	New RPN
Email content creation	Dates/information	Incorrect information communiated	10	Email sequence not checked for accuracy before being sent	5	Correspodence reviewed by senior team member as part of Quality Review	7	350	Further review performed by Project Lead ahead of sequence launch	J Barker - 04/09/22		10	2	10	200
Email content creation	Smart tags	Incorrect information communiated	8	Email not tested - smart tags incorrectly formatted	7	Test email can be sent to admin user in HubSpot	8	448	Test email also sent to project lead ahead of challenge launch to check smart tagging	B Dimitrov - 4/09/22 J Barker - 04/09/22		8	3	9	216
Quality Review in CRM	Logging of review	Information is sent out unchecked and is incorrect	8	Lack of logged information in CRM - use of Trello to record actions	6	Checklists of activities are included in Trello cards with individuals attached	8	384	Explore incorporation of marker in CRM or use of Click-up across organisation	C Petheram-10/10/22		8	5	9	360

The examples in the figure above illustrate a repeatable process that can be maintained over the course of project delivery and FMEA is also linking with present and future systems which shows our embedded approach to adopting this internally within the organisation.

5. Conclusion

In summary this project has allowed SimplyDo to explore inputs and the statistical rationale for adopting an improved automated system for contacting organisations who we want to involve in open innovation activity. The cost saving across challenges is significant with mean reduction on time spent on the activity from 1.67 (or 1 hr 41 mins) to .3640 (or 22 mins) evidenced in Figure… which equates (based on an average of 3 challenges a year with a average of 50 ideas) to a time saving of 65.42 hrs/mins (based on a reduction from 84.16 hours to 18.33 hours). This has also driven continuous quality improvement within organisation with the adoption of SPC and FMEA processes contributing to this highly successful project.

WORD COUNT: 2760

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Appendix 1: Define and Measure Slide Deck

2. About Us

Simply Do

SimplyDo provides 'innovation-as-a-service' enabling organisations to effectively crowdsource and collaborate around solutions to organisational challenges.

This unlocks access to diverse thinking and the co-production of solutions with employees, suppliers, academia and service users.

In addition to working with the **Rolls-Royce (Defence)**, focus sectors include engineering, public services such as health boards, ambulance services, policing, housing and education (FE & HE).

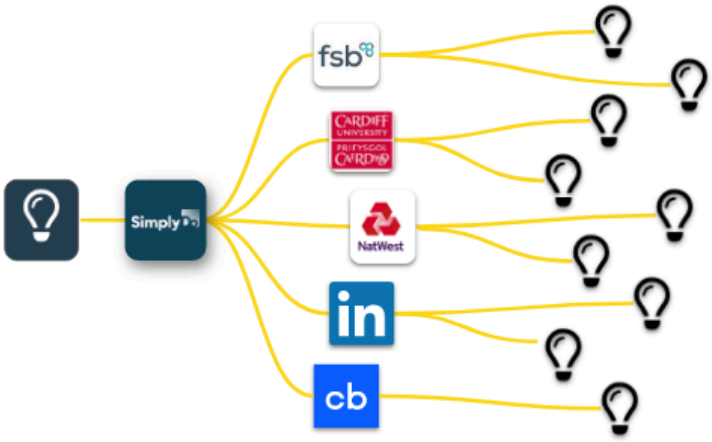
NHS Yorkshire Ambulance Service · GIG CYMRU NHS WALES Bwrdd Iechyd Prifysgol Cwm Taf Morgannwg University Health Board · NHS Guy's and St Thomas' NHS Foundation Trust · Hub Gwyddorau Bywyd Cymru Life Sciences Hub Wales · Canolfan Ragoriaeth SBRI SBRI Centre of Excellence

Rolls-Royce · NatWest · Intellectual Property Office

www.simplydo.co.uk

How It Works

Simply Do



- Reduces risk of innovation
- Reduces time in engaging global marketplace
- Reduces cost of finding suppliers
- Access to newest technologies

Canolfan Ragoriaeth SBRI SBRI Centre of Excellence · Hwb Gwyddorau Bywyd Cymru Life Sciences Hub Wales

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Open Innovation Process

ENGAGEMENT - WP3 (AIM & MEASURES)

The aim is engage as many companies (N=100>)as possible with a proximity to the challenge

CAPTURE SUPPLIER SOLUTIONS - WP4 (CHANGES)

Users enter information guided by the engagement activity to match customer need (n=10>)

CUSTOMER RECEIVES AND VALIDATES SUBMISSIONS - (WP5/6)

Solutions are assessed against criteria specific to each challenge to ensure contractual delivery (min 3-5)

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Project Charter

Problem Statement and area of Opportunity

1. VoC: "We require external solutions provided in a clear and consistent format to support internal assessment."
2. VoC: "Doing the heavy lifting and administration is the stuff we don't have time for."
3. VoC: "Mandraulic process will at some point fall down"
4. VoP: Less than >10 ideas submitted per challenge in comparision to over 100> companies engaged

Problem reduce manual time spent sending out communications and increase idea flow.

Business Need and Justification

Significant staff time (15hr per challenge) is spent on the activity and ensuring greater returns on the investment of time in terms of engagement will ensure contractual fulfilment

Risks and Issues

- Accessing appropriate resources (staff time/systems such as HubSpot)
- New process and system will require training and support internally
- External users are unpredictable and response to communication variable
- Systemic adoption of new system/process will cause cultural resistance

Assumptions and Dependencies

- Movement from manual to automated engagement process will not involve human error
- Users register for the platform using the
- 95% of ideas are moved between stages by administrators; stages which have been setup
- Automated emails are not blocked and include links if required
- Assignment is to individuals, not to departments

Project Ownership / Approval

Project Manager	John Barker	**Project Champion**	John Barker	Approval Date 14-March-202
Project Number	1	**Process Owner**	John Barker/Clair Petherar	

Financial Benefits / Timing

Financial Benefits	Goal	Actual
Resource saving	0.1 FTE per challenge	TBC
Contractual uplift	10%	TBC
Payback Period (yrs)	< Yr 1	TBC
Annual Savings		

Estimated Expenses / Investment	Goal	Actual
Expenses Incremental to Operating Budget	£0	
Capital	£0	
Other		

Schedule	Goal	Actual
Measure	14-Mar-22	Mar-22 - Apr 22
Analyse	1-Apr-22 - 14-Jun-2	14- May-22 -30-Jun-22
Improve	14-Jun-22	4-Jul-22
Control	4-Jul-22 - 31-Jul-2	TBC

Project Team

Supplier Representatives		
Name	Supplier	Title
	SME/ Start Up/Large PLC	Idea Creator
	SME/ Start Up/Large PLC	Innovation Lead
	SME/ Start Up/Large PLC	Exec
	SME/ Start Up/Large PLC	Salesperson

Internal Team		
Name	Function	Role
Will Webberley	Product	CTO
Niall Curtis	Product	Developer

Customer Representatives		
Name	Cust.	Title
Anonymous	Rolls-Royce	Innovation Lead
Anonymous	Rolls-Royce	ovation Technologist
Anonymous	Rolls-Royce	Innovation Buyer

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SIPOC

Simply Do

S	I	P	O	C
Suppliers	**Inputs**	**Process**	**Outputs**	**Customers**
Suppliers/Idea creators: • Sales-people • Innovation stakeholders • Engineers • Heads of R&D • Internal collaborators • CEOs/CTOs Research Officer/Open Innovation Team - SimplyDo	Technology enablement: • Emails • CRM/Email servers • Accessible web-content • Black/white-listing of website Staff resource • Email content • Manual processes	1) Research Officer creates email 2) Internal checks quality review 3) Sends out email content 4) Suppliers register and create content 5) Respond to queries 6) Ideas submitted 7) Ideas reviewed	1) Number of ideas submitted 2) Number of companies engaged 3) Supplier feedback measures (quantitative) 4) Assessed ideas	1) Innovation Team 2) Key stakeholders (engineering teams) 3) Procurement Teams 4) Internal stakeholders

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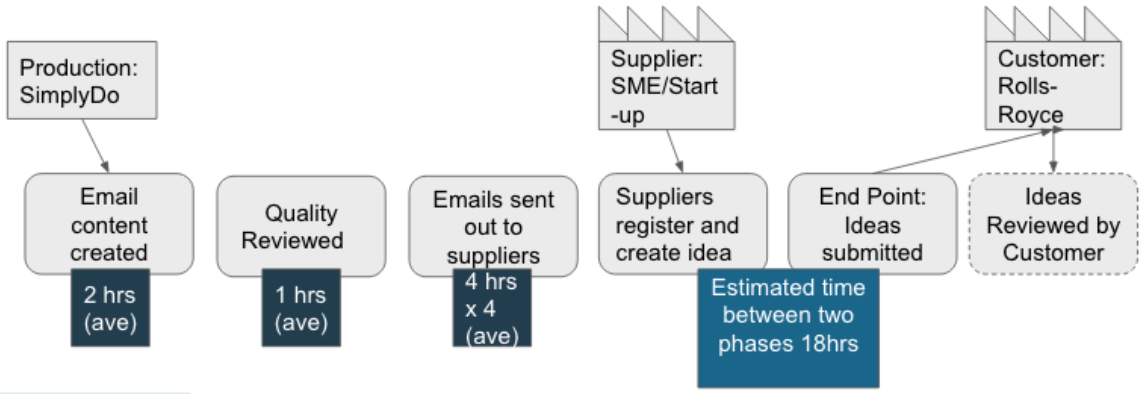
Value Stream Map

Simply Do



User Accessibility

SimplyDo inputs are mandraulic in nature and can be adversely affected by human error
SME/start-up Inputs are always dependent on factors such as entry, login, browser etc. All of these factors can affect the time taken, or engagement with the challenge process.

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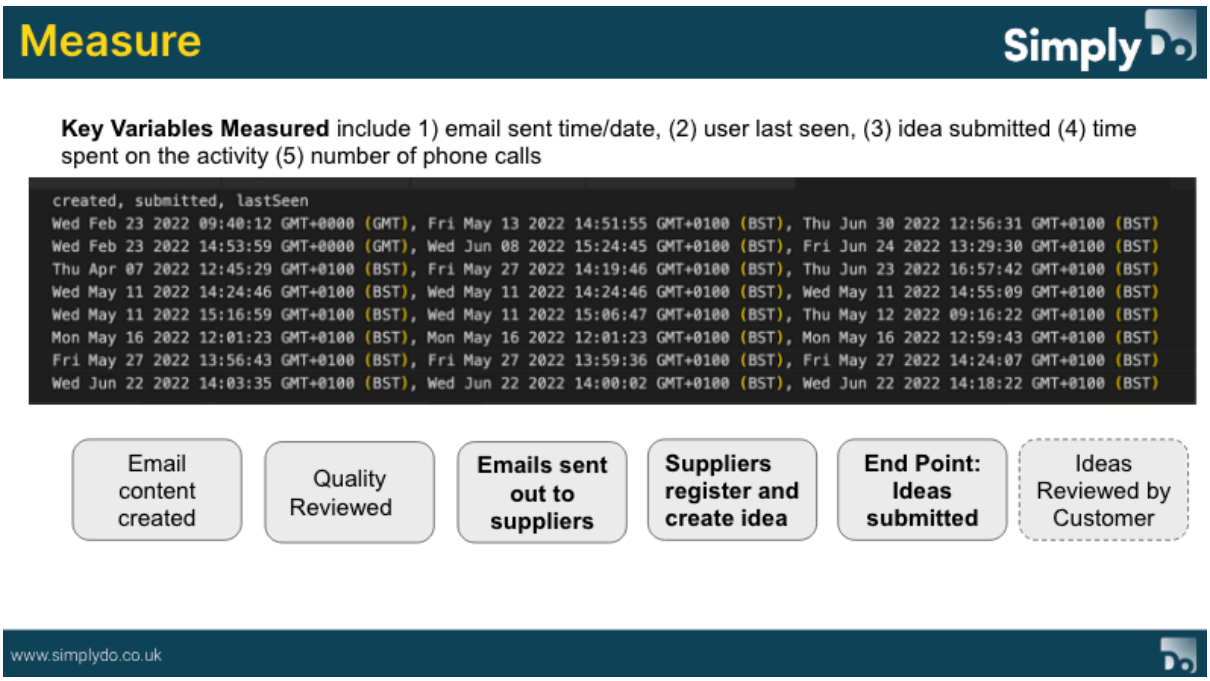


Appendix 2: Descriptive Statistics – Distribution Testing

1.1 Difference (measured in days) between Emailed and Submitted

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Difference_Between_Emailed_and_Submitted	59	96.7%	2	3.3%	61	100.0%

The two missing cases are present due to the availability of data for two submissions were accurate email data was not captured. This could be due to referrals from another customer/supplier.

Descriptives

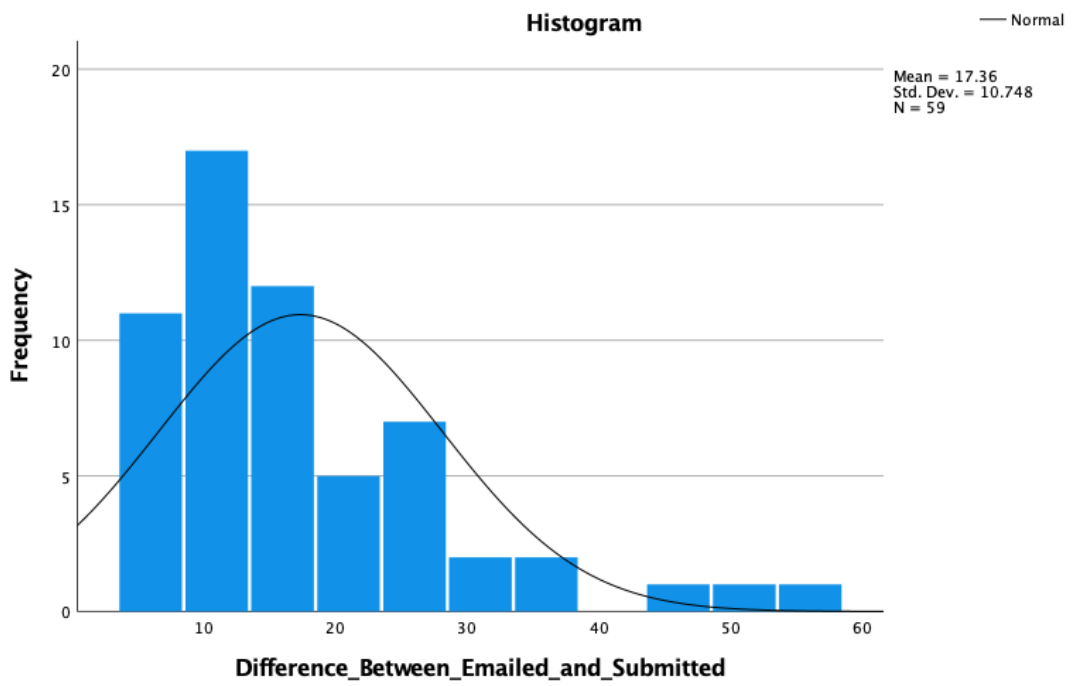
			Statistic	Std. Error
Difference_Between_Emailed_and_Submitted	Mean		17.36	1.399
	95% Confidence Interval for Mean	Lower Bound	14.56	
		Upper Bound	20.16	
	5% Trimmed Mean		16.13	
	Median		15.00	
	Variance		115.509	
	Std. Deviation		10.748	
	Minimum		6	
	Maximum		56	
	Range		50	
	Interquartile Range		13	
	Skewness		1.628	.311
	Kurtosis		3.081	.613

Descriptive statistics are included here to provide a benchmark for analysis as part of the Improve phases but also outline relevant data around the skew of the data and upper and lower means for the purposes of comparison.

Tests of Normality

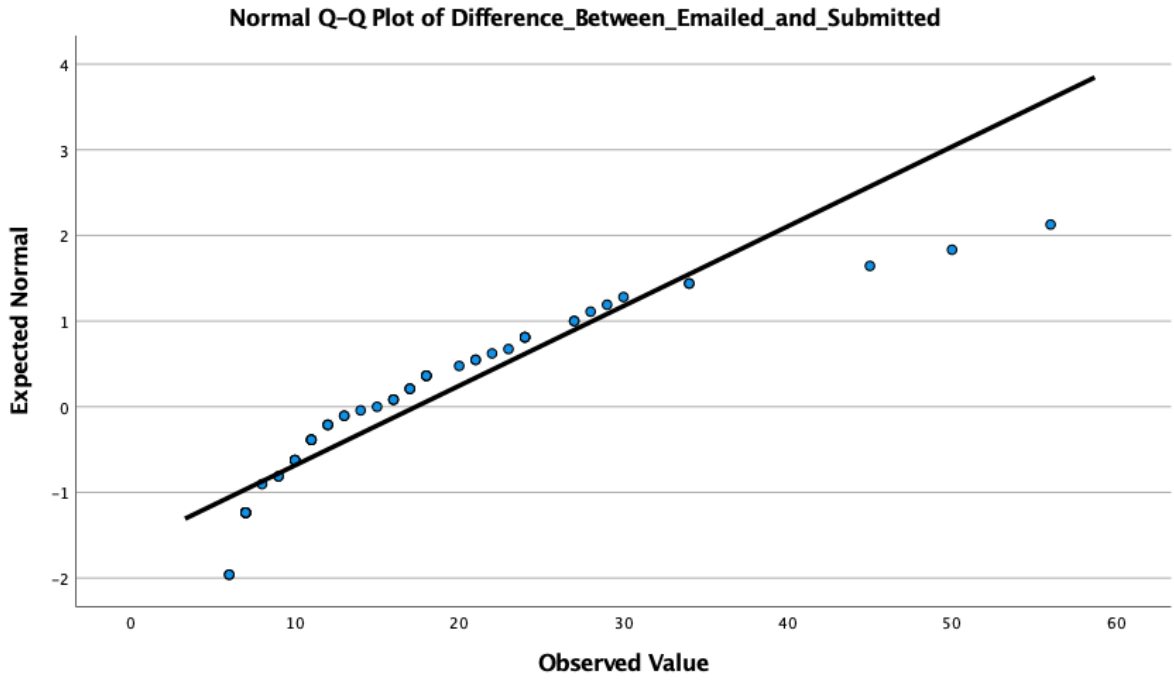
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference_Between_Emailed_and_Submitted	.154	59	.001	.845	59	<.001

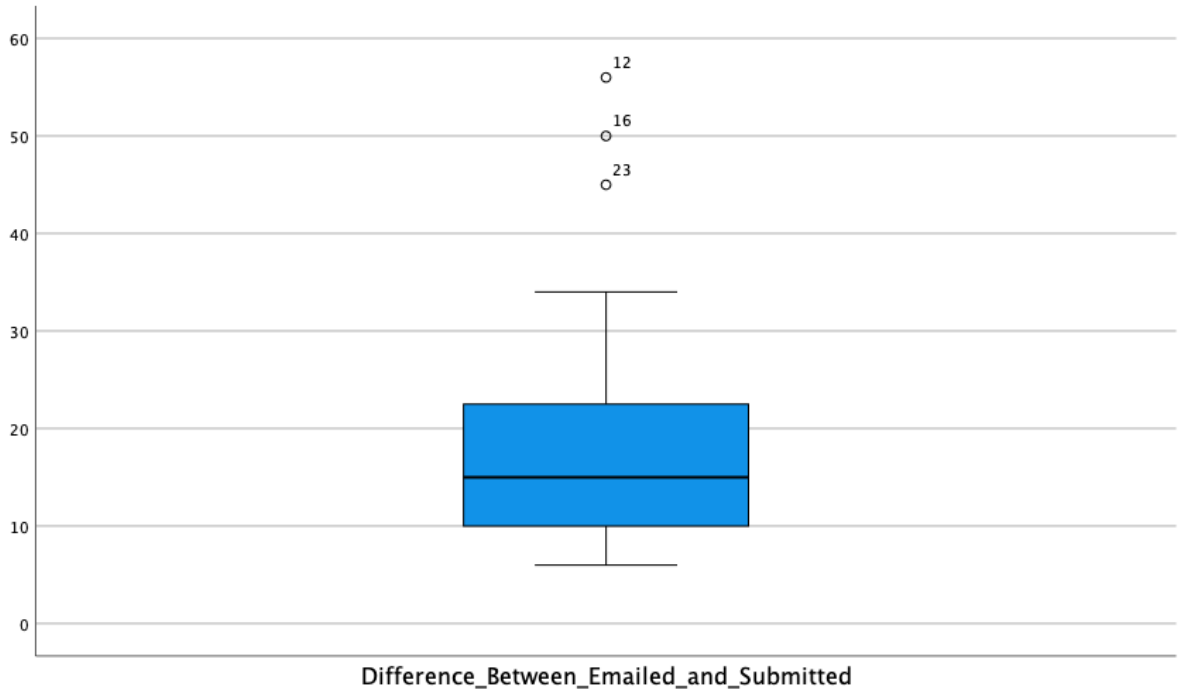
a. Lilliefors Significance Correction



The tests for normality illustrate a relatively non-normative profile. The long tail expressed in the normality tail in the histogram above is due to the outlying data which also impact the skew of the data. The significance value illustrated in the Tests

of Normality (Sig.= .001) also validates this perspective on the normalcy of the data as p=.001.





2.3 Difference (measured in days) between Emailed and Last Seen

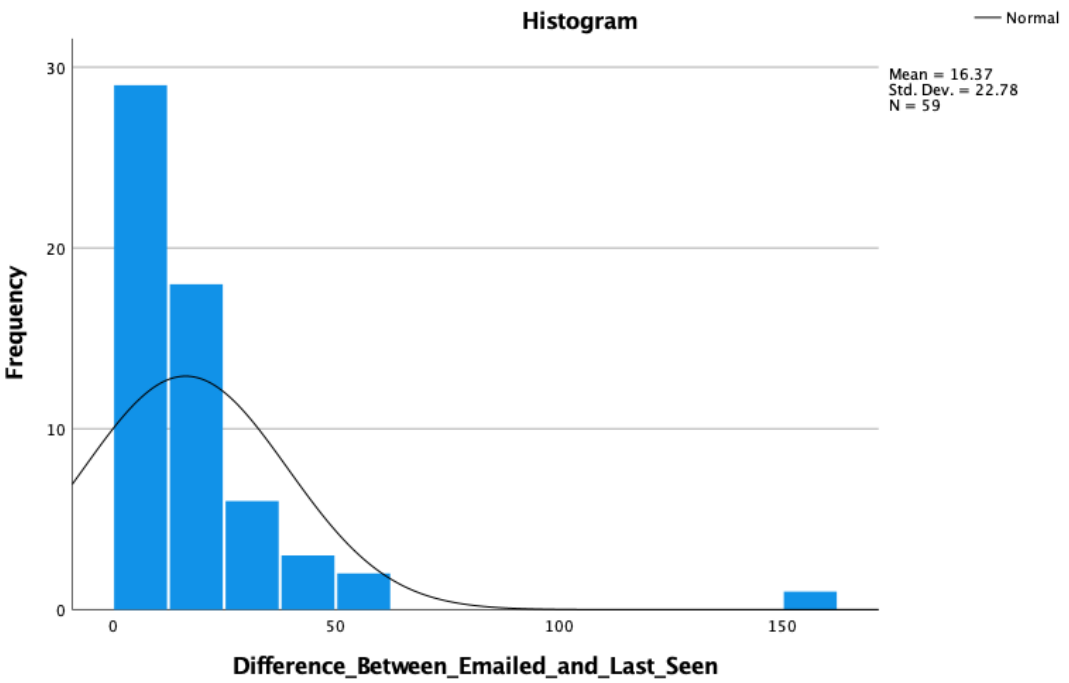
Descriptives

			Statistic	Std. Error
Difference_Between_Emailed_and_Last_Seen	Mean		16.37	2.966
	95% Confidence Interval for Mean	Lower Bound	10.44	
		Upper Bound	22.31	
	5% Trimmed Mean		13.42	
	Median		14.00	
	Variance		518.928	
	Std. Deviation		22.780	
	Minimum		0	
	Maximum		155	
	Range		155	
	Interquartile Range		20	
	Skewness		4.143	.311
	Kurtosis		23.485	.613

Tests of Normality

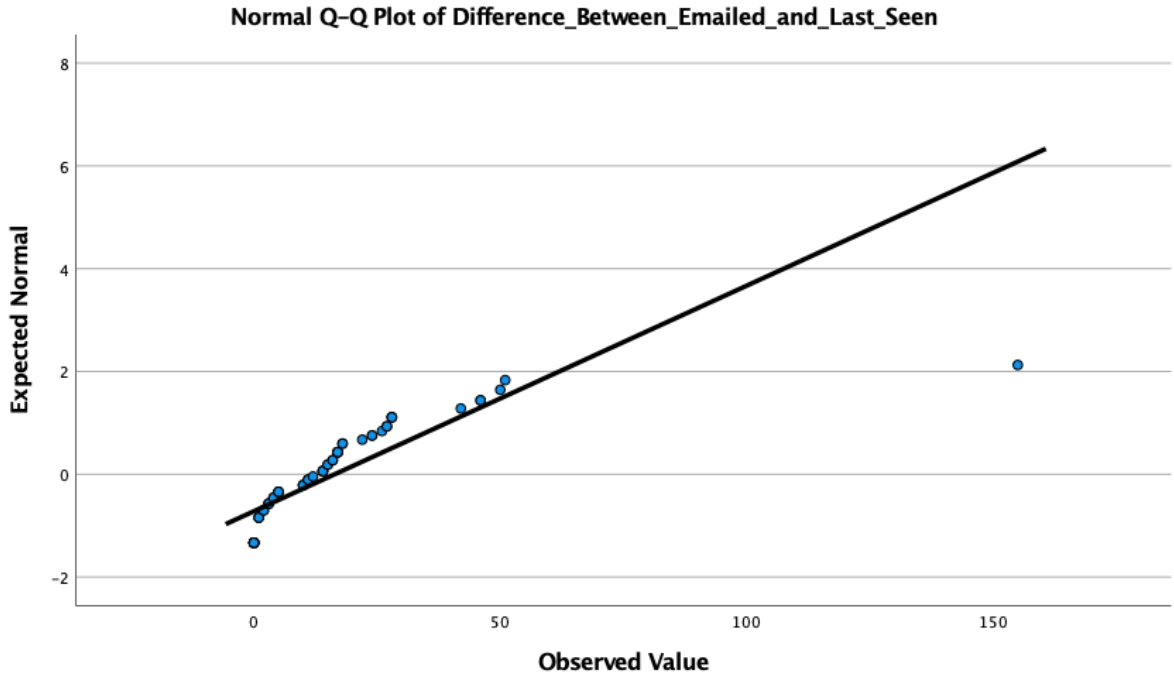
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference_Between_Emailed_and_Last_Seen	.236	59	<.001	.611	59	<.001

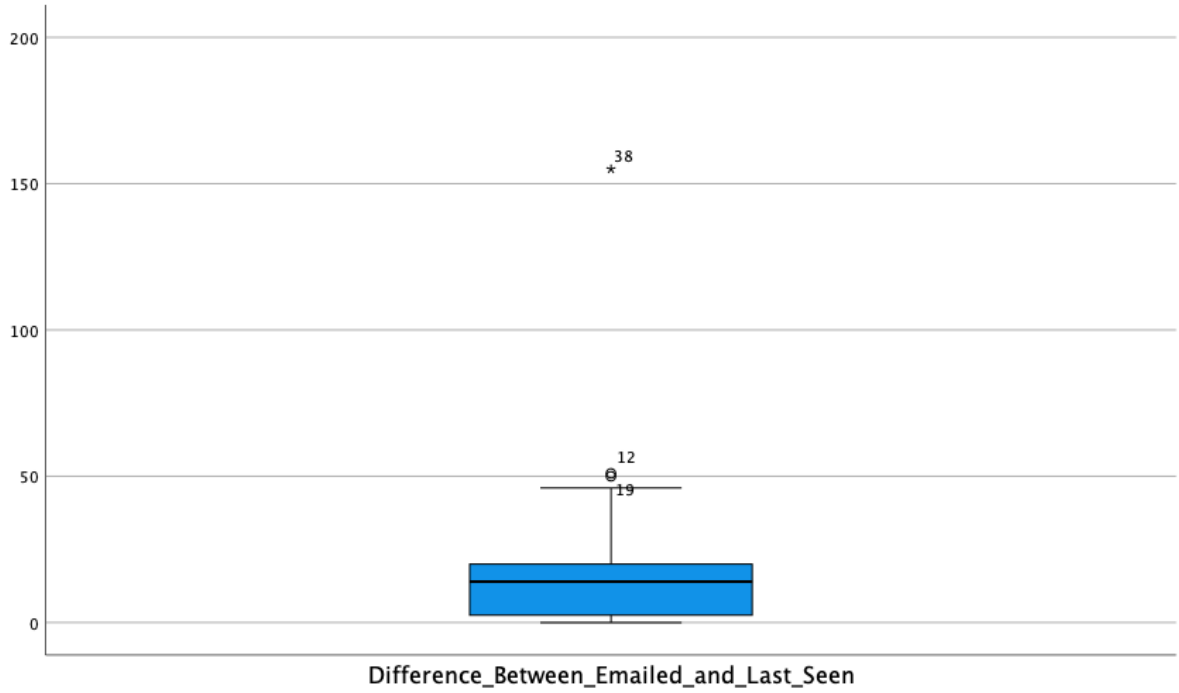
a. Lilliefors Significance Correction



Again tests for normality in comparison to a predicted wider population illustrate the non-normative profile of the data expressed through the Kolmogorov-Smrinov value

of p=<00.1. This is again heavily influence by the outlying data which is also represented in Normal Q-Q Plot illustrated below.





The non-normative nature of the distribution of means for this population illustrates that this report will need to perform non-parametric testing to compare means to conclude the Analyse phase.

2.4 Time Spent on Activity

This variable captured the amount of staff time on average spent on the activity. Distribution testing is included below.

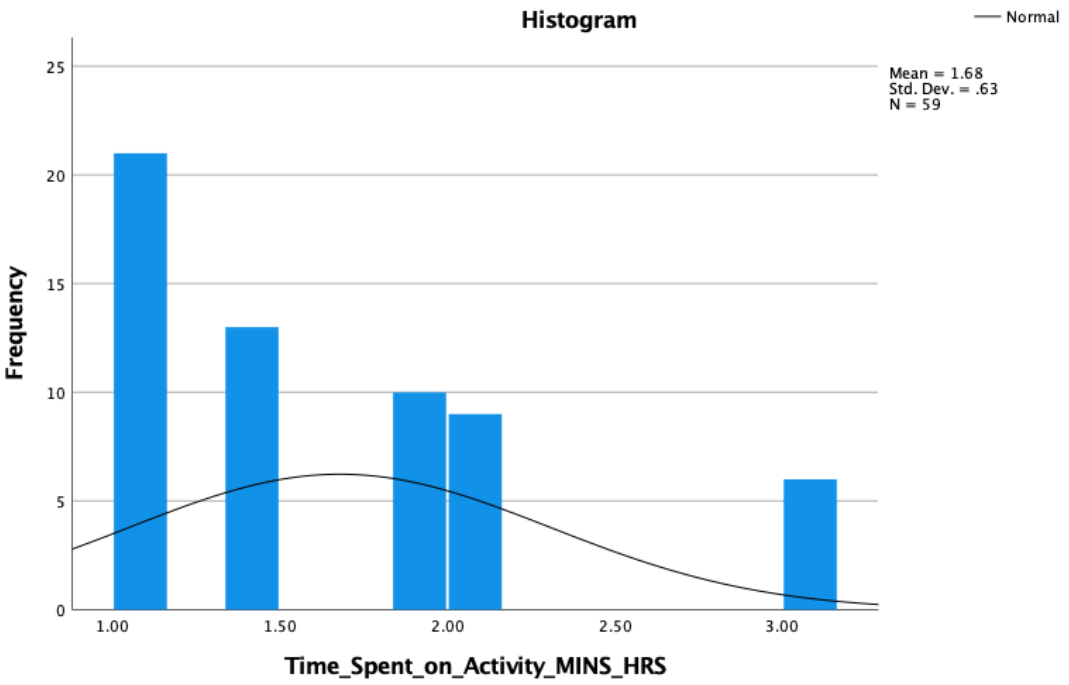
Descriptives

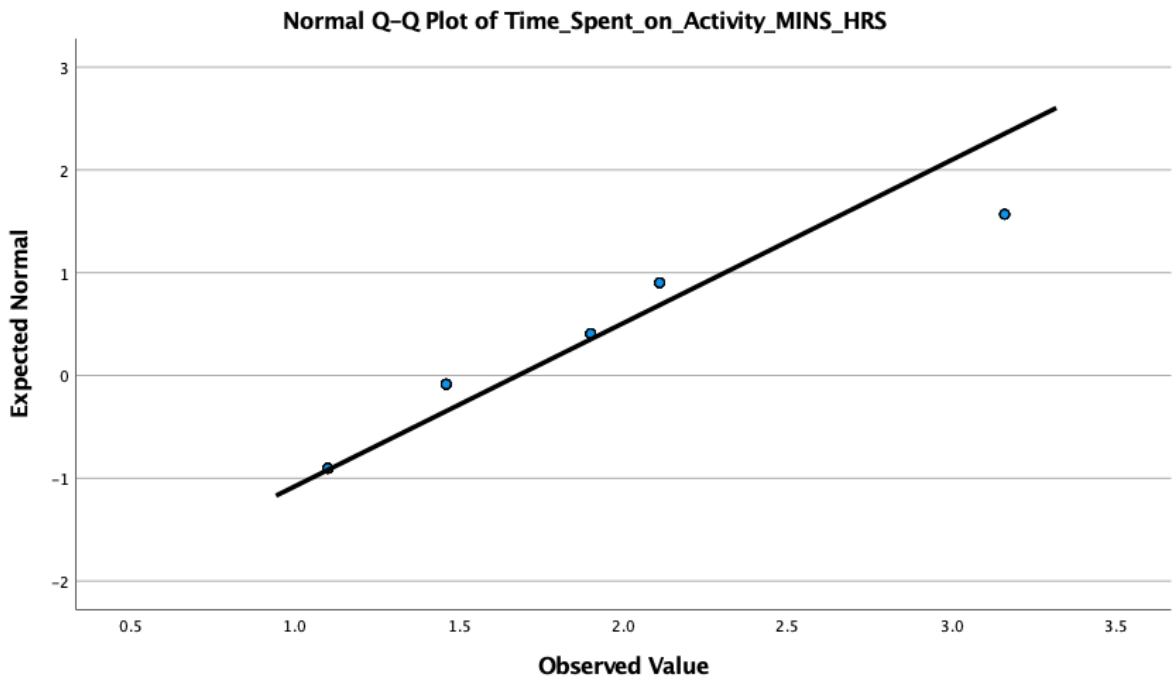
			Statistic	Std. Error
Time_Spent_on_Activity_MINS_HRS	Mean		1.6785	.08195
	95% Confidence Interval for Mean	Lower Bound	1.5144	
		Upper Bound	1.8425	
	5% Trimmed Mean		1.6283	
	Median		1.4600	
	Variance		.396	
	Std. Deviation		.62950	
	Minimum		1.10	
	Maximum		3.16	
	Range		2.06	
	Interquartile Range		1.01	
	Skewness		1.155	.311
	Kurtosis		.689	.613

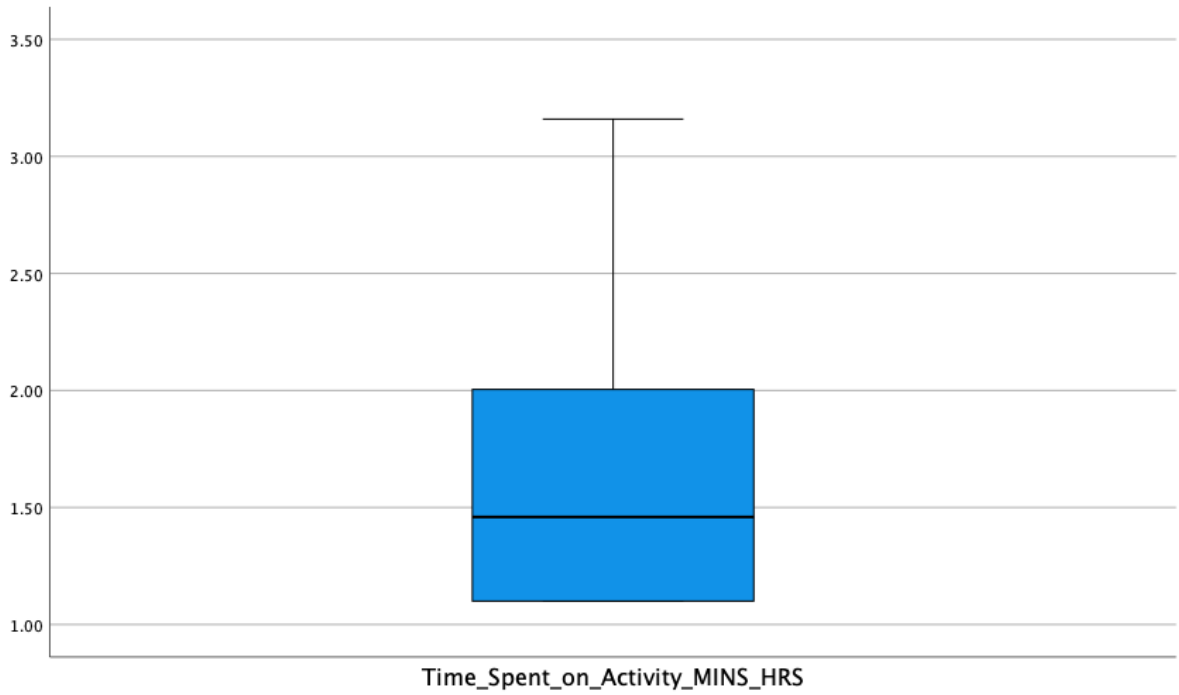
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Time_Spent_on_Activity_MINS_HRS	.212	59	<.001	.807	59	<.001

a. Lilliefors Significance Correction







Again tests for normality in comparison to a predicted wider population illustrate the abnormal profile of the data captured through this variable.

2.5 Number of Phone Calls

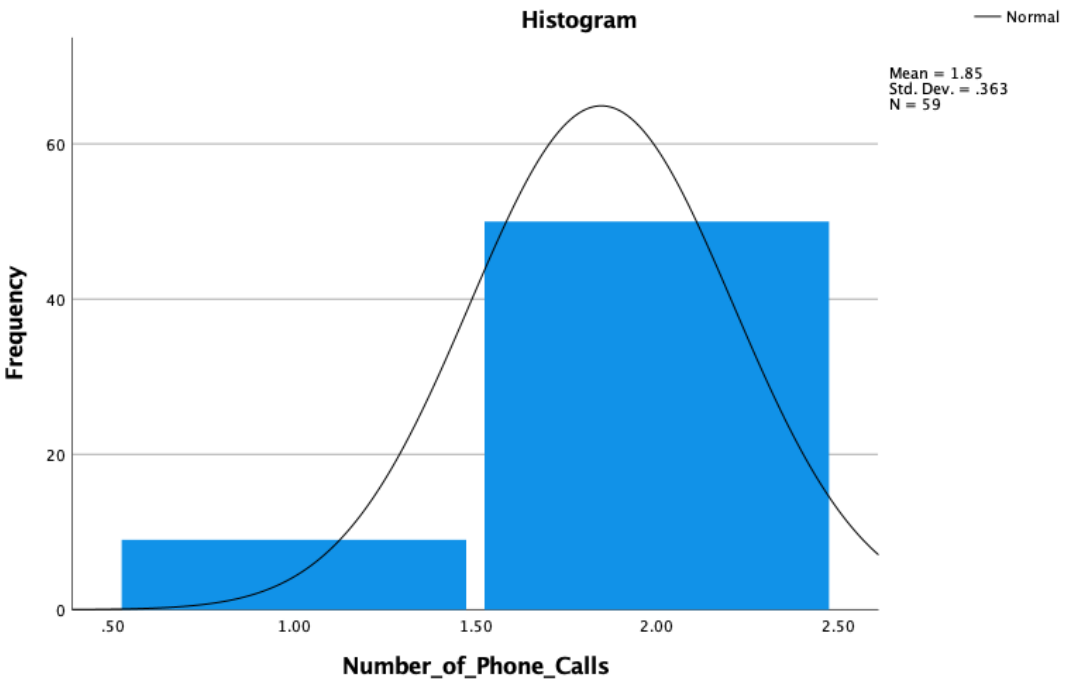
Descriptives

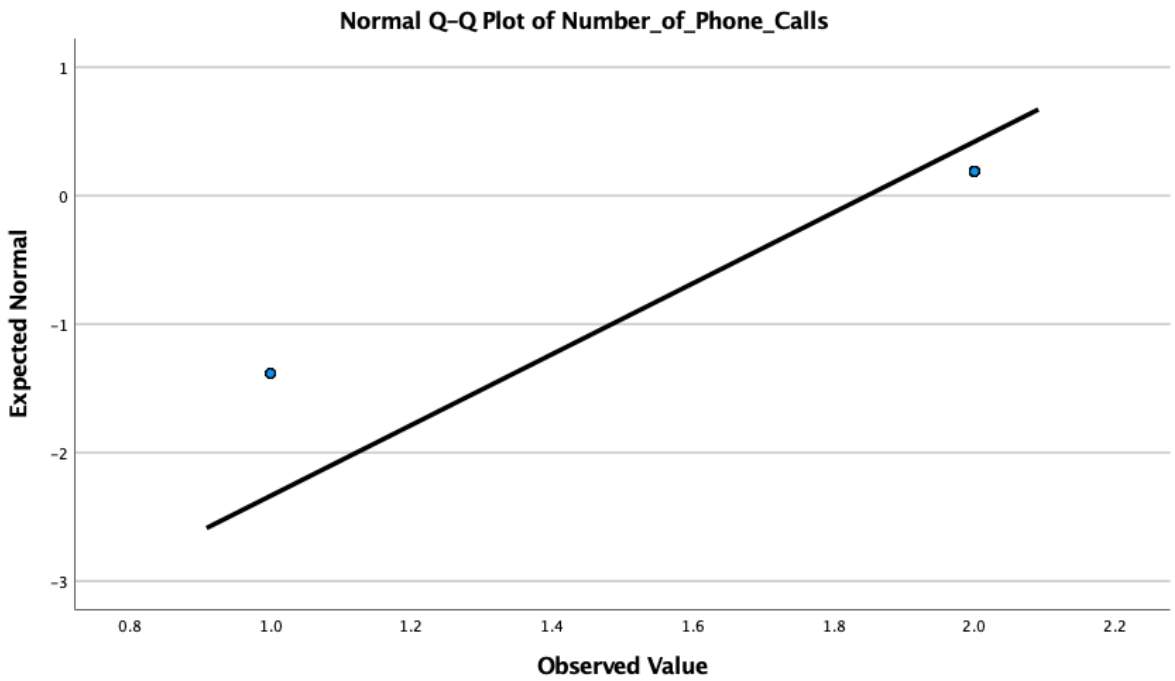
			Statistic	Std. Error
Number_of_Phone_Calls	Mean		1.8475	.04721
	95% Confidence Interval for Mean	Lower Bound	1.7530	
		Upper Bound	1.9420	
	5% Trimmed Mean		1.8861	
	Median		2.0000	
	Variance		.132	
	Std. Deviation		.36263	
	Minimum		1.00	
	Maximum		2.00	
	Range		1.00	
	Interquartile Range		.00	
	Skewness		-1.984	.311
	Kurtosis		2.001	.613

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Number_of_Phone_Calls	.510	59	<.001	.431	59	<.001

a. Lilliefors Significance Correction





1) email sent time/date (2) idea submitted (3) average time spent on