A Case Study on the Handling Time of a Contact Center Company

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Abstract

Statistical Process Control (SPC) is an important tool to solve problems associated in businesses or companies and the most effective way in obtaining process durability and decreasing the variability. In business system, products or service do not always meet the desired range of quality or performance with the customer specification. This occurs due to several sources of variation such as machines, operators, materials etc. The main purpose of control chart is to monitor these variations and control the process. In applying SPC methods, this study deals with the control and improvement of the quality of calls in a Contact Center company by inspecting their three consecutive months' performance. From the inspection, the researchers developed X bar chart and Range (R) control chart from using the necessary data. Through proper investigation, the process will be identified where it is in control or not. For the process of out of control, reasons should be identified and take corrective actions.

Keywords: Statistical Process Control, Mean, Range, Upper Control Limit, Lower Control Limit.

1. Introduction

A control chart is a graph used to study how a process changes over time. It was proposed in the 1920s by Walter A. Shewhart of the Bell Telephone Laboratories. There are two types of control charts: control chart for variables and control char for attributes. The following charts are commonly constructed controlling variables: X-bar (mean) chart, R (range) chart and S (standard deviation) chart. The chart contains a center line which is represented by the average value of the quality characteristic corresponding to the in-control state. It has two control limits namely; Upper Control Limit (UCL) and Lower Control Limit (LCL) that is also represented by a line. By comparing the current data to these lines, a conclusion can be made whether the process variation is consistent (in-control) when the sample points fall between them or if it is unpredictable (out of control) due to the causes of variation. It can be seen when some points go beyond the control limit line. A Contact Center company began operations in the Philippines in 1996 and has grown to become a preferred offshore contact center outsourcing option. The company employs around 40,000 people in the country and operates nearly 30,000 workstations in 20 business sites located across Metro Manila, Antipolo, Baguio, Bacolod, Cebu, Cagayan de Oro and Davao.

2. Literature Review

Statistical Process Control has been the primary focus of every company. Through this control chart, a company can monitor their processes and eliminate variations that make the process out of control which would only generate losses to the company. This control chart is very important so that it makes the process profitable.

Touqir et al. (2014) conducted their work on SPC, in which they focused on controlling and improving the quality of bolt by inspecting the bolt's height, diameter and weight from a bolt manufacturing company. They also focused on Estimated Weighted Moving Range (EWMA) for detecting small process shifts and multivariate Hotelling's T^2 for simultaneous monitoring of height and diameter of bolt.

Momin et al. (2016) conducted their work on control chart, in which they dealt with controlling and uplifting of the quality of pipe through checking and observing the pipe's height, diameter and weight from pipe industry. They also focused on Exponentially Weighted Moving Range (EWMA) for detecting the small process shifts.

Raghavendra et al. (2013) conducted their work on the application of SPC techniques on how to analyze a quality concept to achieve customer satisfaction in cylinder liners manufacturing company particularly in Bharat Industries (Kusalava International ltd.)

Skulj et al. (2013) conducted their work on proposing a service-driven approach for SPC, in which they tried to show how modern information and communication technology (ICT) solutions can be used to build a distributed electronic SPC system (eSPC). The core of the system is a web service, which provides the means for remotely generating SPC reports such as control charts.

Ocheric et al. (2017) conducted their work on SPC, in which they focused on determining the behaviors of the determined chemical compositions of rolled products from the Light Section Mill of the Rolling Mills of the Ajaokuta Steel Company Limited with a view to detecting and eliminating non-random variations in production process.

There have been a few studies that SPC can be applied in service oriented industries such as in Wood (1994). Finnison et. Al (1993) and Sellick (1993) demonstrated the use of control charts in healthcare applications. Sulek (2004) emphasized the importance of the use of control charts to have a complete conceptualization of service quality.

Scordaki and Psarakis (2005) implemented the use of MR control chart in measuring the performance of the sale's process of a commercial company as part of process monitoring. The study made use of time series data based on the assumption that the previous week does not affect the succeeding weeks.

In this study, the control charts are used for process control and monitoring on the handling time of the call center agents for three consecutive months. Control charts can be widely used in different industries not only in manufacturing but in service-oriented industries as well.

3. Methodology

In this study, there were three variables that were observed. These were handling time of three consecutive months which were represented by $x_1 = August$, $x_2 = September$ and $x_3 = October$. In the data collection, there were fifteen samples with three observations. The data were analyzed and interpreted using Minitab software. The types of charts are often classified based on the type of quality characteristic that should be monitored: there are quality control charts for variables and control charts for attributes. Specifically, the following computations that are necessary for controlling variables are presented here.

A. Control limit for X bar chart:

$$UCL = \bar{\bar{X}} + A_2\bar{R} \quad (1)$$
$$CL = \bar{\bar{X}} \quad (2)$$
$$LCL = \bar{\bar{X}} + A_2\bar{R} \quad (3)$$

B. Control limit for R chart:

$$UCL = D_4\bar{R} \quad (4)$$
$$CL = \bar{R} \quad (5)$$
$$LCL = D_3\bar{R} \quad (6)$$

4. Results and Discussion

Control charts represent a control condition if the points in the chart are in the control limit or an out of control condition if there is at least a single point in the chart that is outside of the control limit. Table 1, 2 and 3 shows the data for the average call in terms of seconds attended to by fifteen call center agents and the number of calls that they are receiving in the month August, September and October respectively. It also shows the Average Handling Time (AHT) per agent that is computed as shown in Equation 7.

$$Average\ Handle\ Time\ (AHT) = \frac{talk\ time + hold\ time + wrap{-}up\ time}{total\ number\ of\ calls} \quad (7)$$

In the Contact Center Company, they have a standard average call of 7 minutes and 32 seconds for new hires that they should as much as possible follow because when they exceed the standard time the company itself will pay for the exceeding time. Computing the Standard AHT for new hires, the average handling time obtained is 0.43%. This will serve as the target value for the mean and will be used as a center line for X-bar chart and R chart.

Table 1. Average handling time for the month of August

August			
Agent	**Average Call Time (sec)**	**Number of Calls**	**Average Handling Time (%)**
1	523	945	0.55
2	390	1030	0.37
3	450	1058	0.42
4	632	1145	0.55
5	435	986	0.44
6	432	998	0.43
7	417	1016	0.41
8	420.9	1198	0.35
9	470	1156	0.41
10	409	1201	0.34
11	536	1035	0.51
12	386	1156	0.33
13	448	1214	0.36
14	512	1226	0.41
15	388	1015	0.38

Table 2. Average handling time for the month of September

September			
Agent	**Average Call Time (sec)**	**Number Of Calls**	**Average Handling Time (%)**
1	452	1058	0.43
2	400	1220	0.32
3	432	986	0.44
4	420.3	105	0.40
5	418	1332	0.31
6	480	1230	0.39
7	452	1030	0.44
8	409	1056	0.39
9	418	998	0.42
10	402	1036	0.39
11	582	986	0.59
12	464	1123	0.41
13	414	1006	0.41
14	632	1087	0.58
15	400	1098	0.36

Table 3. Average handling time for the month of October

October			
Agent	**Average Call Time (sec)**	**Number Of Calls**	**Average Handling Time (%)**
1	448	1203	0.37
2	389	1004	0.39
3	362	898	0.43
4	632	1023	0.62
5	540.4	1049	0.52
6	572	1230	0.46
7	412	1003	0.41
8	392	1100	0.30
9	467	1032	0.45
10	533	923	0.58
11	414	996	0.41
12	419	1064	0.39
13	398	996	0.40
14	8526	1123	0.47
15	540.5	1056	0.52

Table 4. Average handling time for the 3 consecutive months

Agent	August	September	October
1	0.55%	0.43%	0.37%
2	0.37%	0.32%	0.39%
3	0.42%	0.44%	0.43%
4	0.55%	0.40%	0.62%
5	0.44%	0.31%	0.52%
6	0.43%	0.39%	0.46%
7	0.41%	0.44%	0.41%
8	0.35%	0.39%	0.30%
9	0.41%	0.42%	0.45%
10	0.34%	0.39%	0.58%
11	0.51%	0.59%	0.41%
12	0.33%	0.41%	0.39%
13	0.36%	0.41%	0.40%
14	0.41%	0.58%	0.47%
15	0.38%	0.36%	0.52%

Table 4 shows all the computed Average Handle Time (AHT) for three consecutive months where there are 15 call center agents for the sample with three observations each. This will be the main data for the researchers to study whether the process is in control or out of control.

4.1 Setting Up X-bar Chart and R Chart Manually:

A. Control limit for X bar chart:

$$UCL = \bar{\bar{X}} + A_2\bar{R} = (0.43) + (1.023)(0.12) = 0.55276$$
$$CL = \bar{\bar{X}} = 0.43$$
$$LCL = \bar{\bar{X}} - A_2\bar{R} = (0.43) - (1.023)(0.12) = 0.30724$$

B. Control limit for R chart:

$$UCL = D_4\bar{R} = (2.574)(0.12) = 0.3088$$
$$CL = \bar{R} = 0.12$$
$$LCL = D_3\bar{R} = (0)(0.12) = 0$$

In the given data, since it does not go beyond the control limits, the X-bar Chart is in control as well as the R Chart is said to be in control since range values are in between the upper and lower control limits.

4.2 Setting Up X-bar Chart and R Chart using Minitab

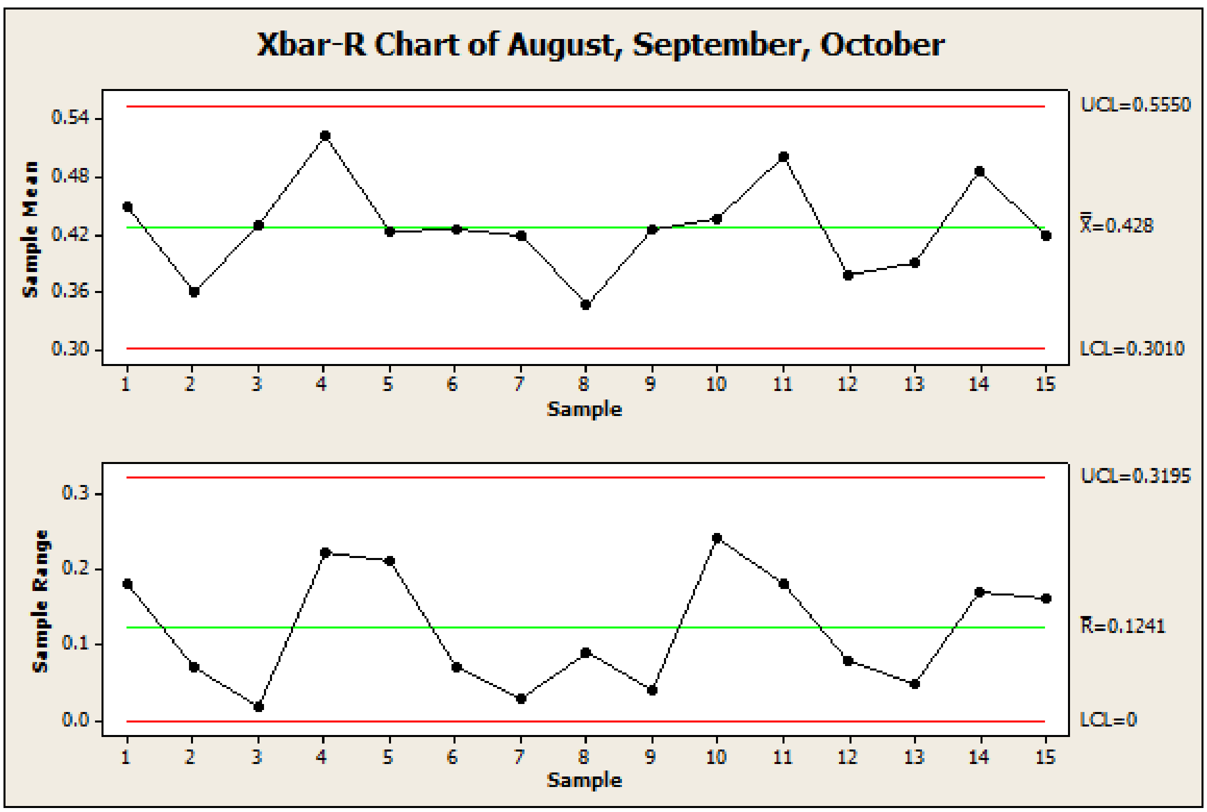

Figure 1. X-bar Chart and R chart of August, September, October

Figure 1 shows the X-bar Chart and R Chart that are being generated based on the given data that the researchers gathered. For the X-bar Chart, UCL = 0.5534, CL = 0.43, and LCL = 0.3066. Since all the plotted points are in between the upper and lower control limit, is shows that the data is in control. For the R Chart, UCL = 0.3106, CL = 0.1207, and LCL = 0. Since all the points are within the range of the control limits, the Range Chart is also in control.

5. Conclusion

In this paper, the control chart is incorporated in assessing the performance of a Contact Center company. Using the quality control chart, a set of activities is achieved like measuring the sources of variation and understanding the process. This will be helpful in continuing to improve the employee's quality of service to their customers. In this study, the researchers conclude that the given data is in control since there are no points that exceed the upper and lower control limit. This shows that the new employees in the Contact Center company have a delivered a good performance in the quality of their work for the given months.

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8. Biographies

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