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IMPROVING BANK CALL CENTER OPERATIONS | Exercise 1 | Process Capability Study

Exercise 1:

Process capability Indices

Using the data given in Table 1,

->Determine the process capability indices for performance metric.

->Provide the appropriate interpretation for the process capability indices drawn, based on the available data.

A. 'First Call Resolution'. The specification limits for the FCR are; LSL=75% and USL=100%.

B. '5 Day Resolution'. The specification limits for the 5DR are; LSL=90% and USL=100%.

Table-1: THISTORICAL BASELINE DATA

SLNO	Month	Number of Reps	Number of calls	AHT	First call Resolution	5- day Resolution	FCR%	5DR%
1	Jan-14	20	22858	4.2	16458	15822	72%	69%
2	Feb-14	20	28963	3.4	22910	22092	79%	76%
3	Mar-14	20	23070	4.9	15826	16697	69%	72%
4	Apr-14	19	29933	2.5	26375	21454	88%	72%
5	May-14	19	26633	4.5	15554	19663	58%	74%
6	Jun-14	19	27638	4	21266	20788	77%	75%
7	Jul-14	19	24553	2.9	23167	20136	94%	82%
8	Aug-14	20	29897	3.3	19913	22544	67%	75%
9	Sep-14	20	23418	4.1	16346	18788	70%	80%
10	Oct-14	21	22901	3.9	18756	14910	82%	65%
11	Nov-14	20	22250	5.6	15308	15301	69%	69%
12	Dec-14	20	27482	4	16324	22585	59%	82%
13	Jan-15	20	24599	4.7	20366	17138	83%	70%
14	Feb-15	20	26413	3.1	25281	15187	96%	57%
15	Mar-15	19	24840	4.9	16221	17691	65%	71%
16	Apr-15	19	27011	3.4	17368	17708	64%	66%
17	May-15	18	21166	4.9	17400	14749	82%	70%
18	Jun-15	18	28871	3.6	26417	21618	92%	75%
19	Jul-15	17	24515	4.2	21003	19949	86%	81%
20	Aug-15	19	21244	3.7	14573	14191	69%	67%
21	Sep-15	20	29950	4	23766	22833	79%	76%
22	Oct-15	20	21387	6.1	14950	14990	70%	70%
23	Nov-15	20	23906	3.6	18848	19047	79%	80%
24	Dec-15	20	27199	4	24115	24258	89%	89%

Process Capability Analysis

Process capability analysis is carried out to measure the ability of a process to meet the specifications.

Process capability (Cp): This is defined as the tolerance width divided by the total spread of process (6 Sigma).

Cp indicates the spread of variation present in a process.

Calculation of Process Capability (Cp) :

$$Cp = \frac{\text{Design Tolerance}}{6\sigma} = \frac{USL - LSL}{6\sigma}$$

USL = Upper Specification Limit, **LSL** = Lower Specification Limit

Process Capability Index (Cpk): This is the capability index that accounts for the centering of the process and is defined as the minimum of Cpk upper and Cpk lower.

Cpk is a measure of process performance capability.
Cpk indicates shifting or closeness of process average from the target or mean value.

Calculation of Process Capability Index (Cpk) :

$$Cpk = \text{Minimum of } Cpk_U \text{ and } Cpk_L$$

$$Cpk_U = \frac{USL - \bar{\bar{X}}}{3\sigma} \quad \text{and} \quad Cpk_L = \frac{\bar{\bar{X}} - LSL}{3\sigma}$$

Interpretations of Cp and Cpk:

When the Cp value is greater than 1 i.e. Cp value >1: The process spread is less and all products fall within the specification limit. Here the process is said to be quite capable of meeting the specification limit.

When the Cp value is equal to 1 i.e. Cp value =1: The process spread is little wide but running within the designed specification limit. Here the process is said to be just capable of meeting the specification limit.

When the Cp value is less than 1 i.e. Cp value <1: The process spread is large and most of the products fall outside the specification limit. Here the process is said to be incapable.

When Cp value equal to Cpk i.e. Cp=Cpk: The Process means is said to be at centre.

When the Cpk value is less than 1 i.e. Cpk value <1: Indicates that the mean of the process is shifted from target and defects will be produced.

When the Cpk value is greater than 1 i.e. Cpk value >1: The center or mean of the process may be shifted from target but still the process is capable of meeting design specification.

In order to achieve Six Sigma quality in the organization, we must reduce the variation in the process so as to achieve the desired value of Cp.

Process Capability Analysis

First Call Resolution		
Upper Specification Limit (USL)= 100%	**USL**	1
Lower Specification Limit (LSL)= 75%	**LSL**	0.75
Standard Deviation of FCR (σ)	**Std.dev**	0.108081187
Mean of FCR (μ)	**Mean**	0.765361501
Cp = (USL-LSL)/(6*σ)	**Cp value**	0.385512668
Cpk upper = (USL - μ)/(3*σ)	**Cpku**	0.72364891
Cpk lower = (μ - LSL)/(3*σ)	**Cpkl**	0.047376426
Cpk = Minimum of Cpku and Cpkl	**Cpk**	0.047376426
Cp and Cpk values are <1. Hence the process is not capable		

5-day Resolution		
Upper Specification Limit (USL)= 100%	**USL**	1
Lower Specification Limit (LSL)= 75%	**LSL**	0.9
Std. Deviation of 5-day Resolution (σ)	**Std.dev**	0.068807566
Mean of 5-day Resolution (μ)	**mean**	0.735066109
Cp = (USL-LSL)/(6*σ)	**Cp value**	0.242221424
Cpk upper = (USL - μ)/(3*σ)	**Cpu**	1.283453288
Cpk lower = (μ - LSL)/(3*σ)	**Cpl**	-0.79901044
Cpk = Minimum of Cpku and Cpkl	**Cpk**	-0.79901044
Cp and Cpk values are <1. Hence the process is not capable		

PROCESS CAPABILITY ANALYSIS		
Cp	**Cpk**	**Remarks**
√	√	• Process is Capable. • Continue process •Process running closure or near to target.
√	X	• Process is potentially capable i.e. Process spread due to variation is less but not centered. • Bring Cpk closure to target by local actions.
X	X	•Process is not capable. •Management action required for process improvement.

Conclusion: Cp and Cpk Values of 'First call Resolution' and '5 Day resolution' are less than 1, indicating that the process is not capable as per Process Capabality analysis.

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IMPROVING BANK CALL CENTER OPERATIONS | Exercise 2(A)| Measurment System Analysis(MSA)

Exercise 2:

A. What kind of data is shown in Table 2?
Which method would you use for measurement system analysis (MSA) to verify the repeatability and reproducibility of QA results? Conduct the appropriate MSA.

Table 2					
Voice Sample	Master Appraiser	John Trial 1	John Trial 2	Miranda Trial 1	Miranda Trial 2
1	3	3	2	3	3
2	2	2	2	2	2
3	2	2	2	2	2
4	4	4	3	4	4
5	2	1	1	1	1
6	5	5	4	5	5
7	4	4	4	5	4
8	3	3	2	3	3
9	3	3	3	3	3
10	4	4	5	4	4
11	2	2	1	2	2
12	3	3	3	3	3
13	5	5	4	5	5
14	2	2	2	2	2
15	2	2	2	2	2
16	2	2	2	2	2
17	2	2	2	2	2
18	4	4	3	4	3
19	3	3	3	3	3
20	2	2	2	2	2

What kind of data is shown in Table 2?

***The data provided above is continuous data. Continuous data is a type of data that can take on any value within a given range. In this case, the data is the measurements of the voice samples, which can take on any value within a given range.**

Some examples of continuous data:Temperature,Weight,Height,Time,Distance,Volume,Speed.

***Attribute data, on the other hand, is a type of data that can only take on a limited number of values. For example, the data could be the gender of the appraisers, which can only take on two values: male or female.**
More examples include True or False, PAss or Fail, colors etc.

Q>Which method would you use for measurement system analysis (MSA) to verify the repeatability and reproducibility of QA results?

*** The most appropriate method for MSA to verify the repeatability and reproducibility of QA results in this case is the ANOVA method.**

In the case of the data provided, we only have one appraiser, so we would use a one-way ANOVA to conduct the MSA. A one-way ANOVA is appropriate when you have one independent variable with multiple levels (groups) and you want to compare the means of the dependent variable across those groups. In this scenario, the independent variable (appraiser) has only one level, while the dependent variable is the voice sample.

Therefore, a one-way ANOVA is suitable to compare the voice samples of one appraiser and two operators. It will assess whether there are statistically significant differences in the voice samples among the three groups (appraiser and two operators).

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Master Appra	20	59	2.95	1.102632
John Trial 1	20	58	2.9	1.252632
John Trial 2	20	52	2.6	1.094737
Miranda Trial	20	59	2.95	1.418421
Miranda Trial	20	57	2.85	1.186842

ANOVA

Source of Variati	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Grou	1.7	4	0.425	0.350934	0.842796	2.467494
Within Group	115.05	95	1.211053			
Total	116.75	99				

***Null Hypothesis: Means are the same.** ***Alternate Hypothesis: Means are different.**
***The P value (0.842) is greater than the significance level (0.05), so we "Cannot Reject the Null Hypothesis (Accept the Null Hypothesis)" that the means are equivalent.**
***There is no significant variation between measurements made by the appraiser. Therefore, the measurement system is considered to be repeatable and reproducible.**

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IMPROVING BANK CALL CENTER OPERATIONS | Exercise 2(B)| Determining Potential causes

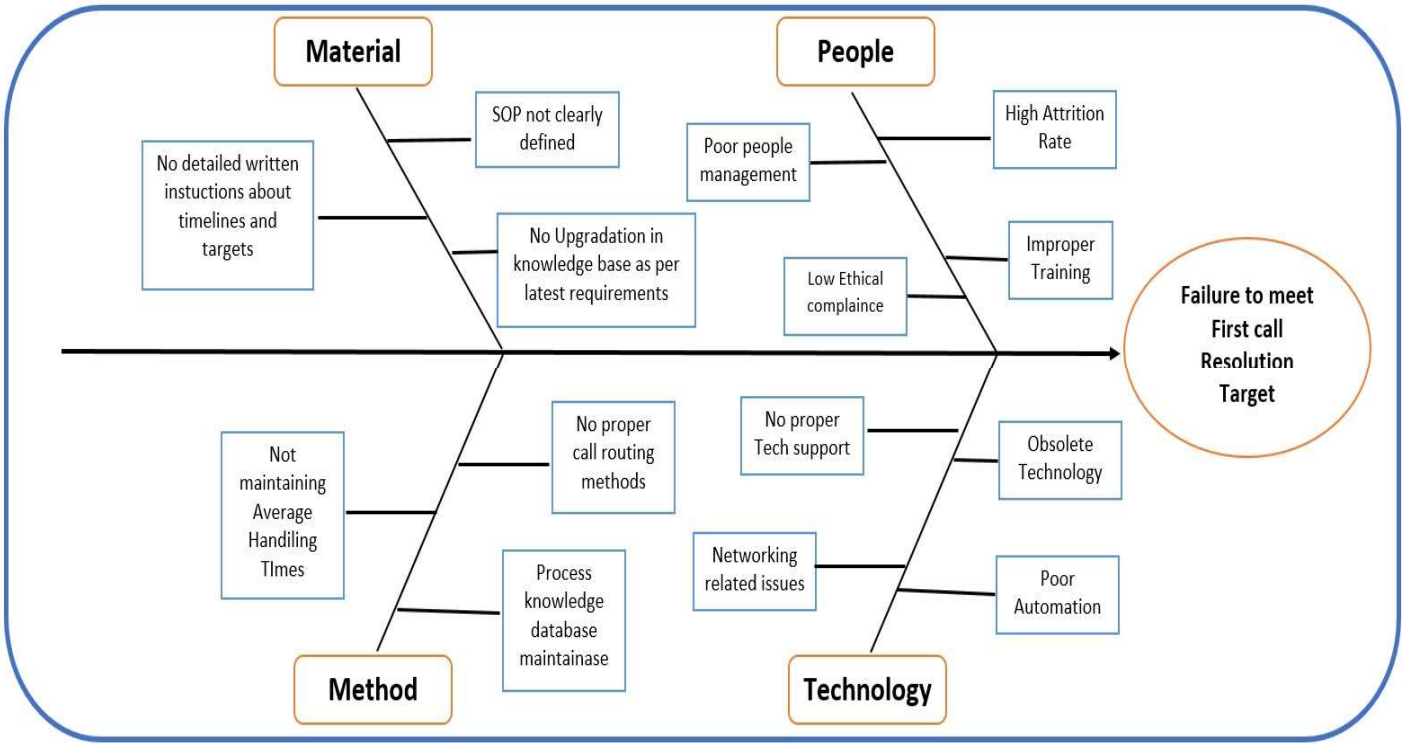
Exercise 2:
B. Determine the **potential causes** why CCS(Customer Calling Services) fails to meet First Call Resolution targets consistently.

> Problem Statement: CCS(Customer Calling Services) is failing to meet First Call Resolution targets consistently.

> Potential Cause: A potential cause refers to a factor or condition that has the possibility of leading to a particular event, outcome, or phenomenon. In the current scenario potential causes are the Factors that are leading CCS to fail in meeting its targets.

> Tools to identify Potential causes: There are several tools that can be used to identify and list out the potential causes and help in performing the root cause analysis of that problem. Some tools are - Pareto charts, 5- WHY analysis, Ishikawa Fishbone Diagram , Brainstorming, Failure Mode and Effects Analysis (FMEA) and Fault Tree Analysis

> We will use Fishbone or Ishikawa diagram to identify the potential causes. This tool helps visually map out potential causes by identifying major categories of factors that could contribute to a problem . It organizes potential causes into categories such as people, process, equipment, materials, methods allowing for a comprehensive analysis.



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IMPROVING BANK CALL CENTER OPERATIONS | Exercise 2(C)| Brainstorm and propose solutions

Exercise 2 :

C. Brainstorm and propose solutions for elimination of causes for failure to meet FCR targets.

Brainstorming

>Brainstorming is using one's ideas and thoughts to storm a problem with a horde of creative solutions. It's a technique used for idea generation and to spark creativity. Brainstorming involves different techniques aiming to resolve the problem statement.

>Problem Statement: CCS(Customer Calling Services) is failing to meet First Call Resolution targets consistently.
>Target: To propose solutions for elimination of causes for failure to meet FCR targets.
>Below are some of solutions for potentials causes obtained after brainstorming.

Potential Causes	Solutions for elimination of causes
Proper Manpower	Improve the recruitment process through identifying the right skill, competency needs and mapping with the roles and responsibilities and ensure that right candidates are recruited for the post.
Standard Operating Procedures	Create standard operating procedures and knowledge base based on the industry standards and standard queries received from the customers.
Obsolete technologies	Implement automation and latest technologies available will help effective call handling and thereby achieving high customer satisfaction.
Training	Budgeting for functional and soft skill training will give them motivation to achieve further in the career growth with the company and also thereby curb the high attrition rate.
Maintaining Knowledge base	Maintaining Knowledge base and procedural updates will help the representatives to provide the First call resolution and thereby achieve the set performance level.

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IMPROVING BANK CALL CENTER OPERATIONS | Exercise 3| FMEA(Failure Mode Effective Analysis)

Exercise 3 :

FMEA

Identify potential failure modes and their effects for the solutions proposed in Exercise 2 using learning on FMEA.

Failure Mode and Effect Analysis (FMEA) is a systematic method for identifying possible failures that pose the greatest overall risk for a process or service which could include failures in design, manufacturing or assembly lines. A process analysis tool, it depends on identifying:

>Failure mode: One of the ways in which a product can fail; one of its possible deficiencies

>Failure Effect: The consequences of a particular mode of failure

>Analysis of the Failure mode: Its severity, occurance and chance of detection.

Solution	Potential Failure mode	Potential Failure effect	Seveарity	Occurance	Detection	RPN
Proper Man Power	Representative not available	Annoyed customer	9	3	6	162%
Standard Operating Procedure	Incorrect resolution provided	Dissatisfied customer	8	6	8	384%
Obsolete Technologies	Network/server Issue	Call drops	10	4	5	160%
Training	Improper guaidance	Annoyed customer	8	2	5	100%
Knowledge Base Maintainance	Inexperience/More hold time	Annoyed customer	9	5	3	135%

Conclusion:

Detailed analysis was carreied out on the questions mentioned as per six sigma practices and detailed expalnation was provided. Six sigma seeks to improve process quality by removing causes of defects and minimizing variability. Proper resolution of problems can be achieved by following Six sigma methodologies.