

**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** = Minimum of  $Cpk_U$  and  $Cpk_L$

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

#### 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 ( $\sigma$ )	Std.dev	0.108081187
Mean of FCR ( $\mu$ )	Mean	0.765361501
$C_p = (USL - LSL)/(6 * \sigma)$	Cp value	0.385512668
$C_{pk\text{ upper}} = (USL - \mu)/(3 * \sigma)$	Cpku	0.72364891
$C_{pk\text{ lower}} = (\mu - LSL)/(3 * \sigma)$	Cpkl	0.047376426
$C_{pk} = \text{Minimum of } C_{pku} \text{ and } C_{pkl}$	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 ( $\sigma$ )	Std.dev	0.068807566
Mean of 5-day Resolution ( $\mu$ )	mean	0.735066109
$C_p = (USL - LSL)/(6 * \sigma)$	Cp value	0.242221424
$C_{pk\text{ upper}} = (USL - \mu)/(3 * \sigma)$	Cpu	1.283453288
$C_{pk\text{ lower}} = (\mu - LSL)/(3 * \sigma)$	Cpl	-0.79901044
$C_{pk} = \text{Minimum of } C_{pku} \text{ and } C_{pkl}$	Cpk	-0.79901044
Cp and Cpk values are <1. Hence the process is not capable		

PROCESS CAPABILITY ANALYSIS		
Cp	Cpk	Remarks
✓	✓	<ul style="list-style-type: none"> <li>Process is Capable.</li> <li>Continue process</li> <li>Process running closure or near to target.</li> </ul>
✓	✗	<ul style="list-style-type: none"> <li>Process is potentially capable i.e. Process spread due to variation is less but not centered.</li> <li>Bring Cpk closure to target by local actions.</li> </ul>
✗	✗	<ul style="list-style-type: none"> <li>Process is not capable.</li> <li>Management action required for process improvement.</li> </ul>

**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.