A Study on Key Performance Indicators and their Influence on Customer Satisfaction in Call Centres

A. K. Sheik Manzoor* and P. Shahabudeen**

Abstract: *The results show that the customer satisfaction is the most important performance indicator followed by benefit cost factor, first call resolution, calls per day by agent, attrition rate, abandon rate, agent utilization and average handling time in call centres. The benefit cost factor, first call resolution and abandon rate are positively influencing the customer satisfaction, while, the average handling time and attrition rate are negatively influencing the customer satisfaction. Both top management and employees should concentrate more and take appropriate efforts to satisfy the needs and expectations of customers in the most efficient and economic ways in call centres.*

Key Words: *Analytic Hierarchy Process (AHP), Customer Satisfaction, Key Performance Indicators*

JEL Classification: Y_1, Y_8, Y_9

1. INTRODUCTION

A call centre is a centralised office used for the purpose of receiving or transmitting a large volume of requests by telephone. An inbound call centre is operated by a company to administer incoming product support or information inquiries from consumers. Outbound call centers are operated for telemarketing, solicitation of charitable or political donations and debt collection. In addition to a call centre, collective handling of letters, faxes, live chat, and e-mails at one location is known as a contact centre.

A call centre is often operated through an extensive open workspace for call centre agents, with work stations that include a computer for each agent, a telephone set/headset connected to a telecom switch, and one or more supervisor stations. It can be independently operated or networked with additional centers, often linked to a corporate computer network, including mainframes, microcomputers and LANs.

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* Assistant Professor, Department of Management Studies, Anna University, Chennai–600 025, *E-mail: sheikmanzoor@gmail.com*

** Professor, Department of Industrial Engineering, Anna University, Chennai–600 025

Increasingly, the voice and data pathways into the centre are linked through a set of new technologies called computer telephony integration (CTI).

Key Performance Indicator (KPI) is a measure of performance of a call center and shows how well a call center works. A call center KPIs depends on business goals of an organisation, for sales oriented call center revenue per successful call and conversion rate will be most the important keeping expenses low and sales rate high. For technical support or customer support service call center main focus should be customer satisfaction.

KPIs can be very good means for assessment of an organisations current position and useful in future strategy and planning. KPIs can identify the aspects of functioning where an organisation is going wrong, enabling management to make the necessary corrective measures for turning the things around. KPIs give an organisation an edge over its competitors. Key performance indicators (KPIs) have the biggest impact on call center quality and call center cost, helping to reduce costs without sacrificing quality or affecting the customer satisfactions. With this background, the present research is attempted to study the key performance indicators and their influence on customer satisfaction in call centres in Chennai.

2. LITERATURE REVIEW

Frenkel and Donoghue (1996) addressed the quality versus quantity issue in a US based case study which examined what they saw as a significant shift in focus of call centres from a cost reduction strategy to a customer interface strategy. They contend that as the role of call centres becomes more sophisticated, managing them becomes more complex. In the case study, the organisation had espoused values of service excellence and identified high quality service provision as its only sustainable competitive advantage. The call centre employed performance standards including a service quality checklist, which aimed to promote consistency of service. Besides, Call centre agents were caught between the needs to deliver quality customer service and to maintain productivity. Work routines were tightly structured agents just sat and took calls, only being able to take breaks at predetermined times. Although call handling statistics weren't being used to manage staff to higher call volumes, they were being used to monitor agent occupancy and there was evidence of increasing management emphasis on achieving and maintaining higher call volumes.

Anton (1997) had suggested the KPIs of call center by classifying into the operation related indicators, income related indicators, cost related indicators and service quality related indicators and especially as for the key indicators of influencing on customer satisfaction in the inbound call center, he had emphasised the percentage of calls closed on first contact, adherence to schedule, average time in queue, average abandonment rate and average response speed. Bain, *et. al.,*(1999) examined the dichotomy between quantitative and qualitative targets within call centres. From consideration of case studies of four call centres in Scotland, they

concluded that target-setting was virtually institutionalised in the call centres and the targets involved what they described as 'hard' measures such as number of calls answered, as well as 'soft' measures such as the call centre agent's level of rapport with the customer. They concluded that the measurement of both the hard and soft measures was deeply rooted in the Taylorist scientific management methodology.

Miciak and Desmarais (2001) found that the success of the call center was pronounced or denounced on a regular basis depending upon its workers' abilities to meet these goals. However, if the strategic advantage that call centers were supposed to afford business revolved around, customer satisfaction, the most common metrics stressed many of the things that were counterproductive to these goals. They also found that a complex environment that must effectively combine knowledge, technology, and workflow to provide quality customer service. A call center was a locus for customer satisfaction. When customers contact a call center, they expect the phone to be answered promptly and to be treated courteously by knowledgeable CSRs who can resolve their issue quickly. Feinberg, *et. al.,* (2002)studied the KPIs of call center related to caller satisfaction. They have suggested the 13 KPIs such as average speed of answer, percent of calls closed on first contact, average abandonment rate, average talk time, adherence to schedule, average work time after call, percentage of calls blocked, average time before abandonment, average calls per agent shift, call center calls per year, agent turnover rate, average time in queue and service level.

de Vericourt and Zhou (2005) modeled a call center in which calls that were not handled successfully cause the customer to call back. This paper examined heterogeneous agents, each of which had potentially different call handling times and call resolution rates and develops a strategy for routing the two different classes of calls across different agent groups. Mehrotra and Grossman (2006) described process improvement methods for a consumer software company's technical support call center. Utilizing CRM data captured during customer phone calls, analysts were able to quantify the impact of specific issues on call volumes and work with the product marketing, engineering, and documentation groups to eliminate specific problems from future software releases. The result of these processes was a lower per-customer call arrival rate as well as increased customer satisfaction.

SoonHoo So (2008) identified that service level, average speed of answer, average time in queue, percentage of response, average abandonment rate, percentage of calls closed on first contact, adherence to schedule, average talk time, average after call work time, agent turnover rate, percentage of calls blocked and customer satisfaction were the KPI of call centers in Korea. Jodie Monger (2009) found that besides service level, average speed of answer, average time in queue, percentage of response, average abandonment rate, percentage of calls closed on first contact, adherence to schedule, average talk time, average after call work time and agent turnover were also considered as other key performance indicators in the call centers.

Oliveira and Joia (2011) found that the "First-Contact Resolution Rate" and the "Average Handle Time After the Call" indicators presented a statistically significant relationship with customer satisfaction. Some alternative call center operational performance indicators were proposed, in an exploratory way, so as to convey an enhanced relationship between call center performance and customer satisfaction.

3. RESEARCH METHODOLOGY

Among the different cities in Tamil Nadu, the Chennai city has been purposively selected followed by top 15 call centers have been selected for the present study. The 500 employees have been selected for the present study by adopting random sampling technique. The data and information have been collected from the employees through structured and pre-tested questionnaire which is in the form of five point Likert scale and the pair wise comparison of key performance indicators of call centres have been collected through Analytic Hierarchy Process (AHP) questionnaire and the data and information pertain to the year 2011-2012.

In order to understand the demographic features of employees of call centres and the key indicators for measurement of performance of call centres, the descriptive statistics has worked out. In order to examine the relationship among the key performance indicators of call centres, the correlation analysis has been applied. In order to prioritise the key indicators for measurement of performance of call centre, the Analytic Hierarchy Process (AHP) has been employed. In order to examine the influence of key performance indicators on customer satisfaction, the multiple regression analysis has been carried out.

4. RESULTS AND DISCUSSION

4.1. Demographic Features of Employees

The demographic features of employees of call centres were analyzed and the results are presented in Table-1. The results show that about 57.80 per cent of the employees are males, while the rest of the 42.20 per cent of the employees are females in call center. It is inferred that the most of the employees of call centre are males. The results indicate that about 50.40 of the employees of call centre are unmarried while the rest of 49.60 per cent of the employees of call centre are married. It is inferred that the most of the employees of call centre are unmarried.

It is observed that about 47.80 per cent of the employees of call centre belong to the age group of 20-25 years followed by 31-35 years (24.60 per cent), 26-30 years (23.40 per cent) and 36 years and above (4.20 per cent). It reveals that the majority of the employees of call centre belong to the age group of 20- 25 years. It is clear that about 27.00 per cent of the employees of call centre are B.Sc.graduates followed by B.E./B.Tech (24.80 per cent), MBA (24.20 per cent), B.Com (23.40 per cent) and M.E./

Table 1
Demographic Features of Employees of Call Centres

Particulars	Employees (N=500)		Particulars	Employees (N=500)	
	Frequency	Per Cent		Frequency	Per Cent
Gender			*Marital Status*		
Male	289	57.80	Married	248	49.60
Female	211	42.20	Unmarried	252	50.40
Age (Years)			*Education*		
20- 25	239	47.80	B.Sc.	135	27.00
26-30	117	23.40	B.Com	117	23.40
31-35	123	24.60	B.E./B.Tech	124	24.80
36 and above	21	4.20	M.E./M.Tech	3	0.60
			MBA	121	24.20
Working Experience (Years)			*Monthly Income(Rs.)*		
< 1	236	47.20	7000-8000	242	48.40
1-3	121	24.20	8001-9000	114	22.80
3-5	88	17.60	9001-10000	84	16.80
5-7	46	9.20	10001-11000	22	4.40
> 7	9	1.80	11001-12000	38	7.60

M.Tech(0.60 per cent). It is inferred that the most of the employees of call centre are B.Sc. graduates.

It is apparent that about 47.80 per cent of the employees of call centre belong have the working experience of less than one year followed by 1-3 years (24.20 per cent), 3-5 years (17.60 per cent), 5-7 years (9.20 per cent) and more than seven years(1.80 per cent). It is inferred that the most of the employees of call centre have the working experience of less than one year. The results reveal that that about 48.40 per cent of the employees of call centre belong to the monthly income group of Rs.7000-8000 followed by Rs.8001-9000 (22.80 per cent), Rs. 9001-10000 (16.80 per cent), Rs.11001-12000 (7.60 per cent) and Rs. 10001-11000 (4.40 per cent). It reveals that the majority of the employees of call centre belong to monthly income group of Rs. 7000-8000.

4.2. Key Indicators for Measurement of Performance of Call Centres

The key indicators for measurement of performance of call centres was analysed by working out mean and standard deviation and the results are presented in Table 2.

The results show that the mean value for customer satisfaction is 4.76 with standard deviation of 0.43, which indicates that the customer satisfaction is the most important performance indicator followed by benefit cost factor (M = 4.67; SD = 0.68), first call resolution (M = 4.20; SD = 0.80), calls per day by agent (M = 4.13; SD = 0.69),

Table 2
Key Indicators for Measurement of Performance of Call Centre

Key Performance Indicators	Mean (M)	Standard Deviation (SD)	F-value	Sig
Benefit Cost Factor	4.67	0.68		
Customer Satisfaction	4.76	0.43		
First Call Resolution	4.20	0.80		
Average Handling Time	3.82	0.83	46.752	0.01
Abandon Rate	3.98	0.82		
Calls per day by agent	4.13	0.69		
Agent Utilisation	3.95	0.68		
Attrition Rate	4.00	0.85		

attrition rate (M = 4.00; SD = 0.85), abandon rate (M = 3.98; SD = 0.82), agent utilisation (M = 3.95; SD = 0.68) and average handling time (M = 3.82; SD = 0.83). The F-value of 46.752 is statistically significant at one per cent level indicating that there is a significant difference in key indicators for measurement of performance among the employees of call centres.

4.3. Relationship Between Key Indicators for Measurement of Performance of Call Centres

The relationship among the key performance indicators for measurement of performance of call centres was analysed by computing correlation coefficient and the results are presented in Table 3. The correlation coefficient between benefit cost factor is positively and significantly associated with customer satisfaction, first call resolution and attrition rate at one per cent level of significance while, the benefit cost factors is positively and significantly correlated with calls per day by agent at five per cent level of significant.

Table 3
Relationship between Key Indicators for Measurement of Performance of Call Centres

	BCF	CS	FCR	AHT	ABT	CPDA	AU	ATR
BCF	**1.00**							
CS	0.29**	**1.00**						
FCR	0.24**	0.18**	**1.00**					
AHT	0.08	-0.02	0.12**	**1.00**				
ABT	0.09	0.07	0.04	0.03	**1.00**			
CPDA	0.09*	0.03	0.15**	0.17**	0.02	**1.00**		
AU	-0.05	-0.05	0.01	-0.01	0.04	0.08	**1.00**	
ATR	0.13**	0.10**	0.13**	0.11**	-0.06	0.15**	0.02	**1.00**

Note: ** indicates significant at one per cent level.
            * indicates significant at five per cent level.

The results show that customer satisfaction is positively and significantly correlated with first call resolution and attrition rate at one per cent level of significance. The first call resolution is significantly and positively associated with average handling time, calls per day by agent and attrition rate at one per cent level of significance. The average handling time is positively and significantly correlated with calls per day by agent and attrition rate at one per cent level of significance and calls per day by agent is significantly and positively associated with attrition rate at one per cent level of significance.

4.4. Prioritising the Key Indicators for Measurement of Performance of Call Centres

The key indicators for measurement of performance of call centres was analysed using Analytic Hierarchy Process (AHP) and the results are discussed as below.

4.4.1. Pair Wise Comparison Matrix of Criteria for Key Performance Indicators to Measure the Performance of Call Centres

The pair wise comparison matrix of criteria for key performance indicators to measure performance of call centres was computed and the results are presented in Table 4. The results indicate that customer satisfaction is more important than benefit cost factor and customer satisfaction is two times more important than benefit cost factor. The benefit cost factor is more important than first call resolution, average handling time, abandoned rate, calls per day by agent, agent utilisation and attrition rate. The benefit cost factor is two times important than first call resolution, average handling time, calls per day by agent and agent utilisation and it is three times important than abandoned rate and attrition rate.

Table 4
Pair Wise Comparison Matrix of Criteria for Key Performance Indicators

Key Performance Indicators	Benefit Cost Factor	Customer Satis-faction	First Call Resolu-tion	Average Handling Time	Abandon Rate	Calls per day by agent	Agent Utilisation	Attrition Rate
Benefit Cost Factor	1.000	0.500	2.000	2.000	3.000	2.000	2.000	3.000
Customer Satisfaction	2.000	1.000	2.000	3.000	3.000	3.000	3.000	4.000
First Call Resolution	0.500	0.500	1.000	2.000	2.000	2.000	2.000	2.000
Average Handling Time	0.500	0.333	0.500	1.000	2.000	0.500	1.000	2.000
Abandon Rate	0.333	0.333	0.500	0.500	1.000	0.500	1.000	1.000
Calls per day by agent	0.500	0.333	0.500	2.000	2.000	1.000	2.000	2.000
Agent Utilisation	0.500	0.333	0.500	1.000	1.000	0.500	1.000	1.000
Attrition Rate	0.333	0.250	0.500	0.500	1.000	0.500	1.000	1.000
SUM	**5.667**	**3.583**	**7.500**	**12.000**	**15.000**	**10.000**	**13.000**	**16.000**

The customer satisfaction is more important than first call resolution, average handling time, abandoned rate, calls per day by agent, agent utilisation and attrition rate. The customer satisfaction is two times more important than first call resolution

and it is four times important than attrition rate. Meanwhile, the customer satisfaction is three times more important than average handling time, abandoned rate, calls per day by agent and agent utilisation. The first call resolution is important than average handling time, abandoned rate, calls per day by agent, agent utilisation and attrition rate and the first call resolution is two times more important than average handling time, abandoned rate, calls per day by agent, agent utilisation and attrition rate.

The average handling time is more important than abandoned rate and attrition rate while calls per day by agent is more important than average handling time and agent utilisation is more important than average handling time. The average handling time is two times important than abandoned rate and attrition rate. The calls per day by agent is two times important than average handling time and agent utilisation is equal to average handling time. The abandoned rate is less important than calls per day by agent and the calls per day agent is two times important than abandoned rate while, agent utilisation and attrition rate is equal to abandoned rate. The call per day by agent is more important than attrition rate and it is two times more important than attrition rate and the attrition rate is equal to agent utilisation.

4.4.2. Normalised Matrix of Criteria for Key Performance Indicators to Measure Performance of Call Centres

The normalised matrix of criteria for key performance indicators to measure performance of call centres was computed and the results are presented in Table-5. The results show that the normalised matrix, in which the sum of the entries in each column is 1. The average of the entries in row i of normalised matrix is calculated. This represents the relative degree of importance for the ith criterion (i.e., weight of the criterion). It shows that the customer satisfaction has the highest priority followed by benefit cost factor, first call resolution, calls per day by agent, average handling time, agent utilisation, abandon rate and attrition rate.

4.3.3. Consistency Ratio for Key Performance Indicators to Measure Performance of Call Centres

The consistency ratio was calculated based on pair wise comparison matrix and normalised matrix and the results are presented in Table 6. The consistency ratio is 0.022 which is less than 0.10. It reveals that the degree of consistency is satisfactory.

The relative weights of importance of (priority weights) of Key Performance Indicators (KPIs) to assess the overall performance of the call center in the order of preference are as given below.

- Customer Satisfaction – 28.80%
- Benefit Cost Factor – 19.20%
- First Call Resolution – 13.90%

Table 5
Normalised Matrix of Criteria for Key Performance Indicators

Key Performance Indicators	Benefit Cost Factor	Customer Satis- faction	First Call Resolu- tion	Average Handling Time	Abandon Rate	Calls per day by agent	Agent Utilisa- tion	Attrition Rate	Relative Weights
Benefit Cost Factor	0.176	0.140	0.267	0.167	0.200	0.200	0.154	0.188	**0.186**
Customer Satisfaction	0.353	0.279	0.267	0.250	0.200	0.300	0.231	0.250	**0.266**
First Call Resolution	0.088	0.140	0.133	0.167	0.133	0.200	0.154	0.125	**0.142**
Average Handling Time	0.088	0.093	0.067	0.083	0.133	0.050	0.077	0.125	**0.090**
Abandon Rate	0.059	0.093	0.067	0.042	0.067	0.050	0.077	0.063	**0.065**
Calls per day by agent	0.088	0.093	0.067	0.167	0.133	0.100	0.154	0.125	**0.116**
Agent Utilisation	0.088	0.093	0.067	0.083	0.067	0.050	0.077	0.063	**0.073**
Attrition Rate	0.059	0.070	0.067	0.042	0.067	0.050	0.077	0.063	**0.062**

Table 6
Consistency Index for Key Performance Indicators

Particulars	Value
No of Criteria (**n**)	8.000
Consistency measure or Eigen value (λ**max**)	8.220
Consistency index (**CI**)	0.031
Random Index (**RI**)	1.410
Consistency Ratio	0.022

- Calls Per day by agent – 8.70%

- Attrition Rate – 8.60%

- Abandon Rate – 8.40%

- Agent Utilisation – 6.70%

- Average Handling Time – 5.60%

4.4. Influence of Key Performance Indicators on Customer Satisfaction in Call Centres

In order to examine the influence of key performance indicators on customer satisfaction, the multiple regression model has employed and the results are presented in Table 7.

Table 7
Influence of Key Performance Indicators on Customer Satisfaction in Call Centres

Performance Indicators	*Regression Co-efficient*	*t-value*	*sig*
Constant	3.759**	16.475	0.000
Benefit Cost Factor	.156**	7.153	0.000
First Call Resolution	.165**	5.841	0.001
Average Handling Time	-.032**	5.508	0.000
Abandon Rate	.027**	2.705	0.007
Calls per day by agent	-.004	-1.415	0.158
Agent Utilization	-.023	1.179	0.239
Attrition Rate	-.030**	-2.372	0.006
R^2	0.52		
Adjusted R^2	0.49		
F-value	8.227		0.000
N	500		

Note: **indicates significant at one per cent level.

The results show that R^2 and adjusted R^2 are 0.52 and 0.49 respectively. This implies that about 49.00 per cent of the variation in dependent variable (Customer Satisfaction) is explained by the independent variables (Key Performance Indicators). The F-value of 8.227 is significant at one per cent level of significance indicating that the regression model is good fit. The results show that benefit cost factor, first call resolution and abandon rate are positively influencing the customer satisfaction, while, the average handling time and attrition rate are negatively influencing the customer satisfaction at one per cent level of significance.

5. CONCLUSION

The forgoing analysis indicates that the most of the employees of call centre are males and the majority of them belong to the age group of 20- 25 years. The most of the employees of call centre are B.Sc. graduates and the majority of them belong to monthly income group of Rs. 7000-8000. The most of the employees of call centre are unmarried and the majority of them belong to the nuclear family. The most of the employees of call centre have the working experience of less than one year.

The benefit cost factor is positively associated with customer satisfaction, first call resolution, attrition rate and calls per day by agent. The customer satisfaction is positively correlated with first call resolution and attrition rate and the first call resolution is positively associated with average handling time, calls per day by agent and attrition rate. The average handling time is positively correlated with calls per day by agent and attrition rate and calls per day by agent is positively associated with attrition rate.

The customer satisfaction is the most important performance indicator followed by benefit cost factor, first call resolution, calls per day by agent, attrition rate,

abandon rate, agent utilization and average handling time. The benefit cost factor, first call resolution and abandon rate are positively influencing the customer satisfaction, while, the average handling time and attrition rate are negatively influencing the customer satisfaction at one per cent level of significance.

Since, the customer satisfaction is the most important performance indicator in call centers, both top management and employees should concentrate more and take appropriate efforts to satisfy the needs and expectations of customers in the most efficient and economic ways. The benefit cost factor, first call resolution and abandon rate should be continuously improved through better job performance practices and the average handling time and attrition rate should be reduced to the maximum possible extent by the employees of call centers. Since, the performance of employees of call center is directly and positively influences the customer satisfaction, the relevant HR practices and trainings should be provided to the employees of call centers.

References

Alexandre Ferreira Oliveira and Luiz Antonio Joia, (2011), Call Center Operational Performance Indicators and Customer Satisfaction: An Explanatory-Exploratory Investigation, *International Journal of Information Systems in the Service Sector*, 3(2), 13-31.

Anton, J., (1997), 'Call Center Management by the Numbers', Purdue University Press/Call Center Press, Annapolis, MD.

Bain, P., Watson, A., Mulvey, G., Taylor, P. and Gall, G., (2002), 'Taylorism, Targets and the Pursuit of Quantity and Quality by Call Centre Management", New Technology, *Work and Employment*, 17(3), 170-185.

de Vericourt, F., and Zhou., Y. P., (2005), 'Managing Response Time in a Call-Routing Problem With Service Failure', *Operations Research*, 53(6), 968-981.

Feinberg, R.A., Hokama, L., Kadam, R. and Kim, I.S., (2002), 'Operational Determinants of Caller Satisfaction in Their Banking/Financial Services Call Center', *International Journal of Bank Marketing*, 20(4), 174-180.

Frenkel, S. and Donoghue, L., (1996), 'Call Centres and Service Excellence', CCC Paper No. 066, Sydney, Australian Graduate School of Management, University of New South Wales.

Jodie Monger, (2009), 'Customer Relationship Metrics, Metrics Net "First Call Resolution: Its Impact and Measurement", *Journal of Marketing*, 21(2), 171-186.

Mehrotra,V., and Grossman, T., (2006), 'New Processes Enhance Cross-Functional Collaboration and Reduce Call Center Costs", Working Paper, No. 26. Oxford University, London.

Miciak, A., and Desmarais, M., (2001), 'Benchmarking Service Quality Performance at Business to Business and Business to Consumer Call Centers', *Journal of Business & Industrial Marketing*, 16(5), 340-353.

SoonHoo So, (2008), 'An Empirical Analysis on the Operational Efficiency of CRM Call Centers in Korea', *IJCSNS International Journal of Computer Science and Network Security*, 7(12), 171-178.