

Research Report

The Impact of Technology on Contact Center Performance



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Research Report

THE IMPACT OF TECHNOLOGY

ON

CONTACT CENTER PERFORMANCE

by

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EXECUTIVE SUMMARY

INTRODUCTION

Contact centers spend millions of dollars each year on technology in hopes of improving their company's competitive position, operational performance and cost structure. Managers often assume that more sophisticated contact center technology will provide better performance and will improve Key Performance Indicators, such as customer satisfaction, first contact resolution and cost per contact.

While the truth of this assumption is sometimes tracked and measured by individual centers undergoing a technology upgrade process, there has never been a statistically valid research study, involving many diverse contact centers, that indicates whether a relationship truly does exist between more advanced technology and better performance. This research paper is the first of its kind to collect and analyze data from a large number of contact centers to determine the existence and intensity of this relationship. It includes validated data sets from 143 contact centers, representing a broad cross-section of industries.

KEY FINDINGS

This research provides positive, statistically relevant evidence showing that more advanced contact center technology provides better contact center performance. More advanced technologies result in more effective and efficient customer interactions. For instance, they:

- Improve Customer Satisfaction.
- Lower Cost per Call
- Increase First Contact Resolution
- Increase Calls Handled per Agent per Hour
- Reduce Queue Time
- Improve Agent Satisfaction

In particular the study showed that contact centers with more advanced technologies:

- Improve their first call resolution rate between 4% to 13% using technologies such as:
 - Contact data analytics
 - Advanced routing capabilities
 - Advanced reporting and analytical tools
- Report Costs Per Call that are lower by as much as 35% with technologies such as:

- Presence-based expert escalation
 - Multi-criteria skills-based routing
 - Courtesy callbacks
 - Integration of Apps and CTI (computer-telephony integration)
- Improve Top Box Customer Satisfaction (i.e., customers who rate their overall satisfaction with an interaction as 5 out of 5) by between 5% and 7% using technologies like:
 - Cradle-to-Grave Reporting
 - Contact Data Analytics
 - Workforce Management
- Improve Bottom Box Customer Satisfaction (i.e., customers who rate their overall satisfaction with an interaction as 1 out of 5) between 39% and 66% using:
 - Workforce Management
 - Speech Recognition
 - Call Recording & Retrieval
 - Touch-tone IVR (DTMF)
- Improve Calls per Agent per Hour between 6% and 18% using technologies like:
 - Multi-Criteria Routing
 - CTI & Apps Integration
 - Presence-Based Expert Escalation
 - Unified Cross-Channel Routing
 - Natural Language IVR
- Improve Top Box Agent Satisfaction (i.e. agents who rate their overall satisfaction with their work as 1 out of 5) between 4% to 11% with technologies including:
 - Advanced Reporting & Analytics
 - Agent Desktop with CTI
 - CTI & Apps Integration
 - Real-time Agent Feedback Tools
- Reduce Average Queue Time between 12% to 43% with technologies including:
 - Presence-Based Expert Escalation
 - Courtesy Call-Back while in Queue
 - Blended Routing
 - Multi-Criteria Routing
- Improve Multi-Channel (e-mail and chat) performance by implementing technologies such as:
 - Universal Multi-Channel Queue
 - Unified Cross-Channel Routing

- o CTI & Apps Integration
- o and others

The results indicate that today's contact center technologies can be potent enablers of superior performance, both in terms of satisfying customers and in terms of improving financial performance.

Also, the research found that quality and costs are not necessarily at odds. With increased technology, contact centers can enjoy both lower cost per call *and* higher customer satisfaction.

BACKGROUND AND PURPOSE OF THIS STUDY

BenchmarkPortal has collected call center metrics and conducted research on contact center technology since its beginnings in 1995, at Purdue University. Our research shows that a common attribute of great contact centers is their ability to assemble and optimize three elements: people, processes and technology.ⁱ

The present study focuses on the statistical impact of technology on contact center performance. It is one of the "big picture" issues for the contact center sector that has never been subjected to rigorous scientific inquiry. Naturally, this issue has important implications for management decisions regarding technology acquisition, and thus may help determine whether managers can justify requests to their senior executives for technology investments by using scientifically-supported evidence about cost savings and improved quality of service. (See "Conundrum" box below).

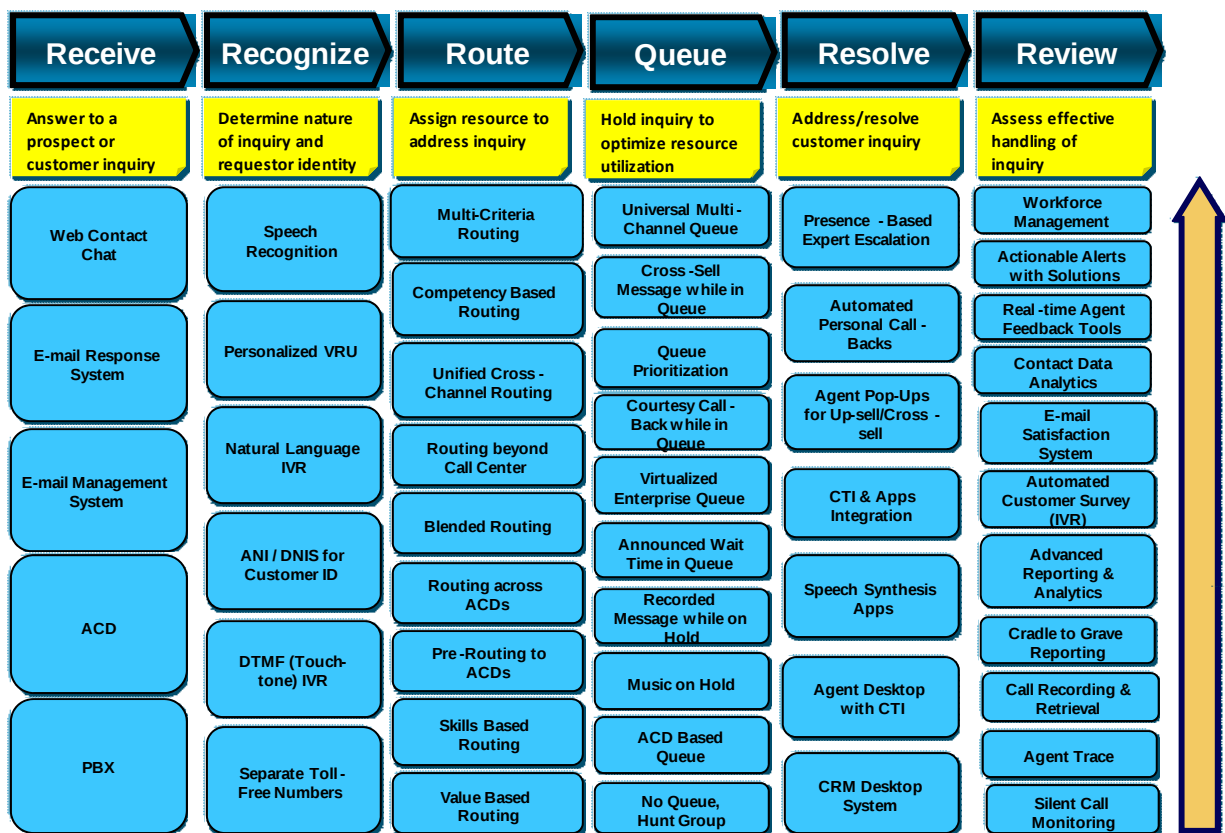
The "Cost Center" Conundrum

The common perception of many top executives is that the contact center is an unavoidable cost center. They insist that managers squeeze ever more out of their people, or find ways to cut waste out of processes, rather than considering investment in technology. However, our research over the last decade has indicated that investment in new technology generally improves contact center operational processes and delivers better financial results. We frequently find that technology investments in customer contact centers pay for themselves within a year or two. In fact, technology acquisitions for the customer contact area often yield higher ROI's than investments made in a company's core products and services, indicating that well-chosen purchases in contact center technology are an imperative for optimizing enterprise value. However, a major, statistically-relevant study on this topic has been missing until now.

Technological Maturity Framework

The framework used in this study to determine a contact center's technology maturity is called the Contact Center Maturity Model, (see Figure 1 below). In it, forty-eight contact center technologies are divided into six groups, or "silos," which correspond to the flow and management of contacts from beginning to end:

1. **Connect.** The point of entry for a customer contact
2. **Recognize.** The system determines the general nature of the inquiry and, perhaps, the identity of the requestor
3. **Route.** A resource (automated or human) is assigned to address the inquiry
4. **Queue.** The inquiry is "held" until a resource is available to address it
5. **Resolve.** The customer inquiry is addressed and, hopefully, resolved, in either an automated fashion or by a live agent.
6. **Review.** The effectiveness and efficiency of handling inquiries in phases 1 through 5 above are measured and assessed to determine how well they were done.



Source: Cisco CCG and BenchmarkPortal Customer Business Transformation (C BT). Patent Pending

Figure 1. The Contact Center Maturity Model

Contact centers with only basic levels of technology are represented by the bottom row of the chart. Sophistication and advanced capabilities increase from the bottom to the top of each column and follow the arrow labeled "Maturity."

From this conceptual starting point, we were able to assemble the survey components for the study and also design the statistical analyses that would allow us to draw conclusions useful for the study's participants and the contact center sector in general.

Research Methodology

We were conscious of the groundbreaking nature of this research and the challenges of obtaining good, abundant data. Thus we opted for straightforward methodologies in executing this study, with emphasis on quality of data.

Survey Assembly and Fielding

Technology component: A comprehensive technology survey was constructed based on the Contact Center Maturity Model (Figure 1), which included questions on those forty-eight technological functionalities. This survey was sent to participants and provided us with a rich database of information on the technology possessed by each participant. (Survey shown in Appendix D.)

Performance data component: We utilized BenchmarkPortal's well-known benchmarking survey, the In-Depth RealityCheck (IDRC), which gathers data on the voice channel. The IDRC was supplemented by survey questions on multi-channel metrics (e-mail and chat). In total, 65 data points were requested from participants, covering everything from volume of interactions, to human resources, to cost-related metrics and quality-related metrics. (Surveys shown in Appendix D.) We note that, while an increasing number of contact centers are becoming multi-channel, the level of multi-channel adoption is still fairly low, and some contact centers which have recently added extra channels do not yet gather performance metrics on those channels. Only 13.7% of the respondents to this study could provide multi-channel data. We expect this to increase in the future, as managers try to better understand and optimize all channels under their control.

Electronic invitations to participate were E-mailed to members of the BenchmarkPortal community and to a list of contact centers supplied by the study's sponsor, Cisco. Web links were included in the invitations which brought the participant to the surveys. Participants who had recently filled out an IDRC were allowed to use that data for purposes of this study.

Data Quality

The fielding efforts brought in 322 sets of data from participants. We applied careful quality controls to the data, which included fixed parameters and formula-based cross checks on the performance data received. Where there were errors or questions, we went back to the participant so as to validate or correct the submission. If we were unable to validate data, the data set was eliminated. At the end of the process, there were 143 data sets that met the standards required for inclusion in the study.

Participation by Sector

The participants included in the study were from a wide variety of sectors; they broke down by industry as follows:

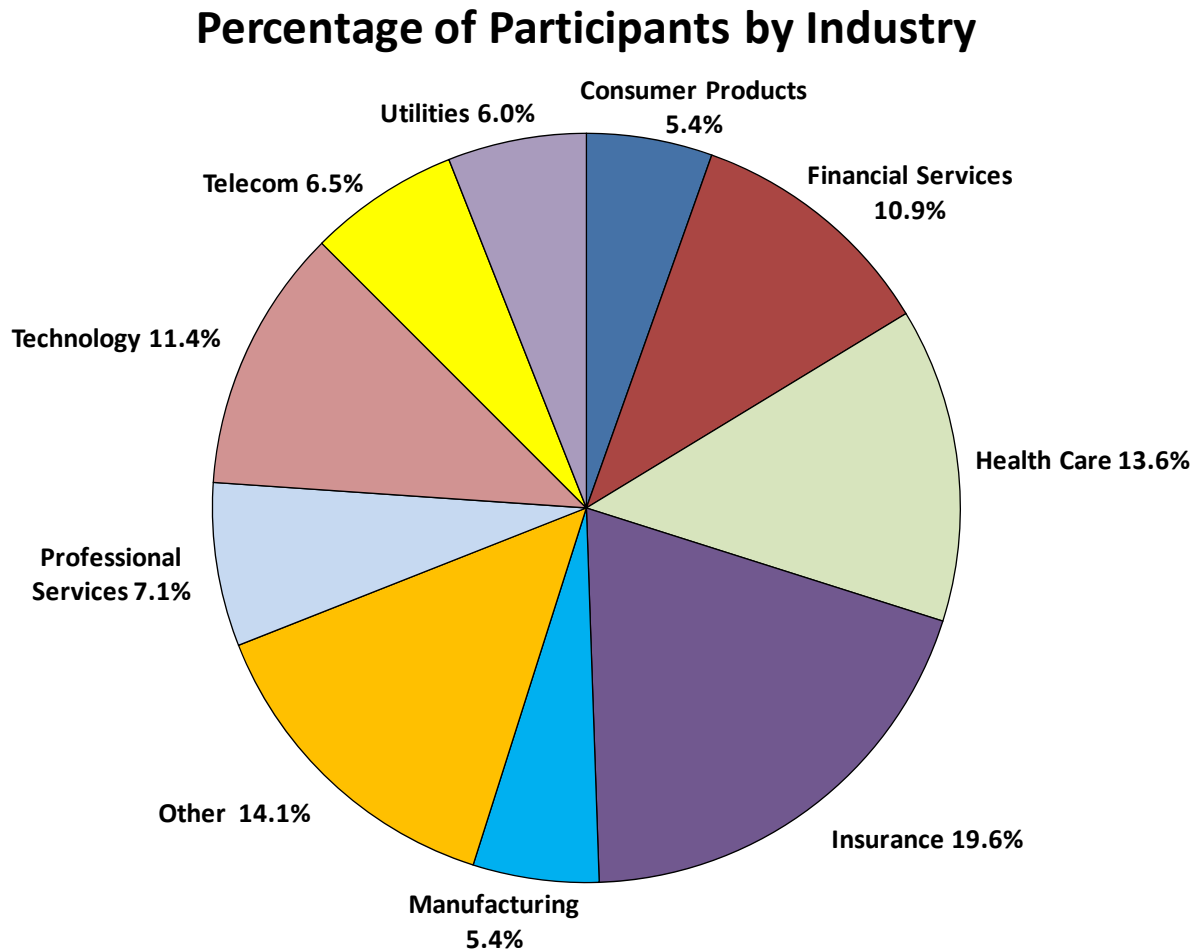


Figure2. Percentage of Participants by Industry

STATISTICAL ANALYTICS APPROACH

The statistical analyses performed in this study were determined by two main factors: the objective of the current research and the nature of the collected data. Since our main goal was to examine the relationship between technology sophistication and call center performance, we performed two types of analysis - a correlation analysis and t-test. A correlation analysis is a statistical test used to measure the association between two variables not necessarily dependent or independent. The t-test takes one variable and compares the difference between the statistical averages of the two groups (i.e., a group which has a given technology and a group which does not).

As indicated above, we collected two major sets of data: data on technology and data on call center performance. The performance data set was predominantly continuous. The set of data for technology was entirely "non-parametric" (or non-continuous, i.e., "yes" or "no" answers for presence of a given technology).

Three main types of analyses (further described below) were performed on the data:

1. The first one, which we named "Macro Analysis," brought together the data on all technologies and major Key Performance Indicator (KPI) metrics.
2. The second type of analysis was metric-by-metric "Drill-Down Analysis," which singled out major KPI metrics affected by the presence of given technologies.
3. The third type of analysis, named "Combined Effect Analysis," examined the effect of all studied technologies on selected KPI's simultaneously.

In the next section, we will indicate the KPIs on which we focused for the research.

KPI Selection

The KPI's in the following table were singled out for particular attention, as they are metrics which most executives consider bellwethers of healthy contact center performance, in terms of quality and/or financial efficiency:

Metric	Definition	Significance
First Call Resolution (FCR)	The total numbers of calls completely resolved during the course of the first call initiated by the customer (and therefore do not require a callback) divided by total number of calls handled by agents – in percent.	Considered the "magic metric" by many, FCR is both a quality metric (correlating with caller satisfaction) and a financial metric (cost saver).
Calls per Agent per Hour	The number of calls handled by agents divided by the number of available agent hours	Key productivity metric which improves when workforce scheduling, desktop technology and training are optimized.
Cost per Call	Budget for the period divided by the number of calls handled in the call center for the same period.	Important financial metric which includes all appropriate costs
Customer Satisfaction (Top and Bottom Box Scores)	Top Box is the percentage of perfect scores (5 out of 5) received on the question "Overall, how satisfied were you with the interaction?". Bottom Box is the percentage of 1 out of 5 scores.	Top and Bottom Box Satisfaction are core metrics which indicate quality of service as perceived by the customer.
Agent Satisfaction (Top and Bottom Box Scores)	Top Box is the percentage of perfect scores (5 out of 5) received on the question "Overall, how satisfied are you with your job?" Bottom Box is the percentage of 1 out of 5 scores.	Called key "canary in the call center" metrics by the authors, they reflect the efficacy of technologies, people and processes in the center, and help predict customer satisfaction as well.
Queue Time	This is the average wait time that a caller experiences waiting for an agent to answer the telephone after being placed in the queue by the ACD.	While dependent on the level of staffing of the center, queue time is also heavily influenced by technology that allows faster closing of calls.
Multi-channel metrics	E-mail and Chat costs and first contact resolution.	While still not measured reliably by a majority of centers, these metrics are gaining importance.

Figure 3. Key Performance Metrics

Macro Analysis

To measure the overall technological maturity of a call center and its effect on performance, we introduced a technology index based on the presence of available technologies. For example, a call center that reported ten different types of technologies had a technology index score equal to 10. As the Contact Center Maturity Model (Figure 1) shows, more technology effectively means more sophisticated technology, since, for example, centers with 35 of the named technologies are farther up the maturity chain than centers with only 10 of the named technologies. The maximum potential score based on our questionnaire was 48ⁱⁱ and the average of the survey sample was 24.12. For this initial study no weighting of the named technologies was applied.

Spearman's rank correlation analysis was employed to determine this Macro effect of technology on the contact center performance. More information is found in Appendix B.

Drill-down Statistical Analysis

In addition to the Macro Analysis, we wanted to measure the effect of individual technologies on the selected set of performance metrics. The research team looked at certain key performance metrics to determine which specific technologies showed a noteworthy impact.

For these analyses, unpaired two sample t-tests were performed. These tests assessed the statistical significance of the difference between the performance metrics averages of contact centers with and without the presence of a particular technology. The statistical detail is in Appendix C.

Combined Effect Analysis

Finally, we wanted to examine the combined effect of technology on several pairs of contact center KPI's, specifically Cost per Call and Customer Satisfaction, First Call Resolution and Customer Satisfaction, Cost per Call and First Call Resolution, and Customer Satisfaction and Agent Satisfaction.

By taking the output from the previous "Drill-down Analysis" we performed Pearson's correlation tests on the above KPI pairs. We correlated the percentage difference between the averages of the samples with and without the presence of technology for these pairs; i.e., so-called t-tests. More detail is found under Combined Effect results (below).

RESEARCH FINDINGS: TECHNOLOGIES THAT IMPROVE KEY PERFORMANCE METRICS

Macro Findings

The findings at the Macro level, which considered the overall impact of technology on performance using Spearman Correlation analysis, included the following:

Key Performance Indicator	Spearman Correlation (rho)	Probability (p)	Confidence Interval
First Call Resolution	0.2137	0.008	95%
Average Calls per Agent per Hour	0.1848	0.012	95%
Top Box Agent Satisfaction	0.1859	0.002	95%

Figure 4. Key Metrics That Improve as Overall Technological Maturity Increases

Across our sample, it was shown that higher levels of technological maturity correspond to improved levels of performance in these key metrics.

First Call Resolution (FCR)

The data indicate that FCR improves reliably as technology becomes more sophisticated. This finding was predictable but important, since FCR is an indicator that calls are being received and routed the right way to sources that can satisfy the information requests of the customer with the information at hand - without having to research the issue and revert, or else refer out the customer. Technology is key to accomplishing this.

Average Calls Handled per Agent per Hour

The data also show that more advanced levels of technology enable higher Average Calls Handled per Agent per Hour. Statistically, more advanced technologies help agents become more effective and efficient service professionals. These technologies make sure a customer is directly connected to the source of information best suited to help them, and enable agents to access and input necessary information about the customer, as well as access information about the products and services which are the subject of their calls. Combined with good training, this helps agents process calls more quickly.

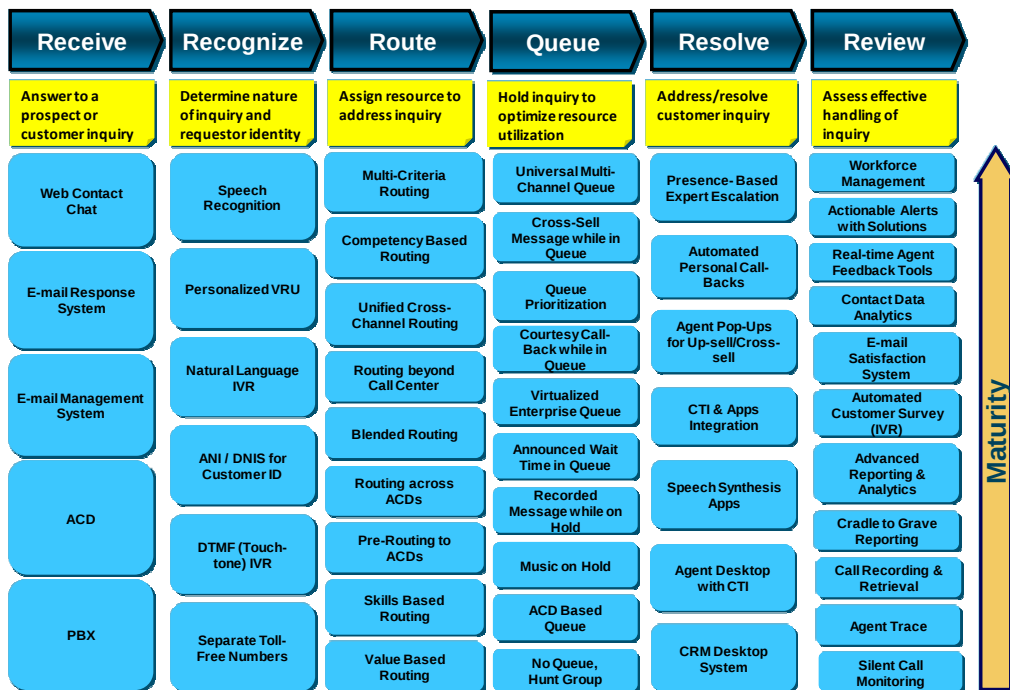
Agent Satisfaction

Agent satisfaction also is greater in centers with more sophisticated technology. Agents generally want to help customers. Stress and frustration result when systems are inadequate or slow, screens lock-up, many applications must be open at once, or agents don't have the information they need in front of them to solve issues, etc. Stress causes sickness, absence, under-performance, low morale and high attrition levels. Technologies that foster a positive work experience and enable agents to come to successful resolutions with their customers provide a better employee experience as well as better customer experiences. Also, a higher level of agent satisfaction promotes lower turnover and reduces costs to the center.

Thus, from our Macro analysis we see that centers with higher levels of technology can expect, on average, to:

- Resolve more calls on the first call
- Handle more calls per hour
- Increase the percentage of highly satisfied agents.

The Contact Center Maturity Model, Figure 1, is repeated here as a courtesy to the reader to assist in following the Drill-Down Research Findings below.



Source: Cisco CCG-Customer Business Transformation (CBT). Patent Pending

Drill-Down Analyses: Impacts of Technology on Key Performance Metrics

The results of the Drill-Down Analyses, which addressed the relationship between individual metrics and specific technologies, included the following:

First Contact Resolution (FCR)

The t-tests indicate that by using the technologies in Figure 5 contact centers can, on average, improve their first call resolution rate substantially, as seen below:

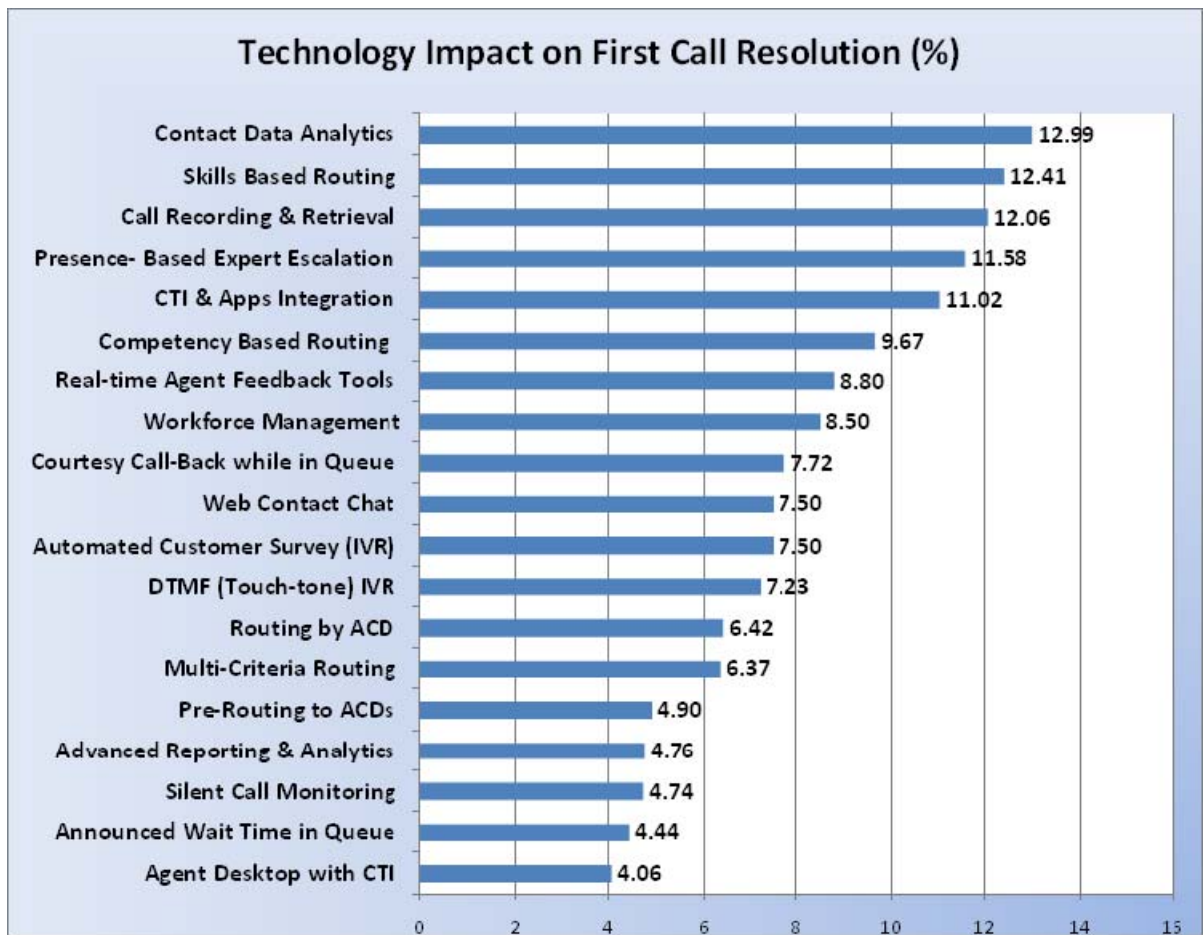


Figure 5. Technologies That Improve First Contact Resolution

Important effects were found with technologies residing in the Route, Queue, Resolve and Review groups identified in The Contact Center Maturity Model (Figure 1.). Centers with these technologies had anywhere from 4% to 13% better performance in FCR as compared with

centers in the study without these technologies. Highly ranked technologies were clustered in the following four groups:

Route: Routing via ACD, skills-based, competency-based, multi-criteria and blended routing

Queue: Courtesy callbacks, announced wait time

Resolve: Presence-based expert escalation, CTI applications integration, agent desktop apps

Review: Analytics, call recording, real-time agent feedback tools, automated customer surveys, reporting and analytics, call monitoring and cradle-to-grave reporting

The data imply that those technologies that route and queue inquiries properly increase the probability that the contacts will be handled appropriately and completely when they reach the "resolve" phase. In addition, agents who are enabled by the proper desktop technologies (CRM and CTI systems, etc.) are able to find and communicate the correct answer that the customer needs to satisfy and close an inquiry. The transparency and feedback that come with superior review tools, including real-time agent feedback, also appear to be major factors.

To put this finding into managerial context, we consider the savings that could result from installing a technology or technologies that improve FCR by 7%, which is in the mid-range of the results shown above. We make the conservative assumption that an unresolved call will have only one follow-up call to reach final resolution. We also use the average Cost per Call for the sample of participants, which was \$5.05.

Hypothetical Financial Impact of Improved First Call Resolution	
Calls Handled per Year	2,000,000
Reduced Follow-Up Calls (7%)	140,000
Average Cost per Call	\$5.05
Total Calculated Annual Savings	\$707,000.00

Figure 6. Hypothetical Financial Impact of Improved First Call Resolution

Understanding that this is but one of the potential financial impacts of this technology, it is clearly worth investigating technologies that could provide such savings, and then calculating the return on investment to see if it will benefit the center financially.

In addition, if a center's data shows a positive correlation between FCR and Caller Satisfaction, then managers would find themselves with an important added benefit in terms of quality

measurements. The hypothetical situation below reflects a center whose data indicate that Caller Satisfaction improves by 1% for every 2% improvement in FCR:

Hypothetical Improvement in Caller Satisfaction	
Improvement in First Call Resolution	7.0%
Assuming improvement of 1% Caller Sat for every 2% improvement in FCR	2.0%
Expected Improvement in Caller Sat	3.5%

Figure 7. Hypothetical Improvement in Caller Satisfaction

In the contact center world, where each point of caller satisfaction is a battle to be fought and won, this could be of great importance to many managers.

For additional information on the data refer to Appendix C.

Cost Per Call

Cost per Call was reduced significantly by the technologies in Figure 8:

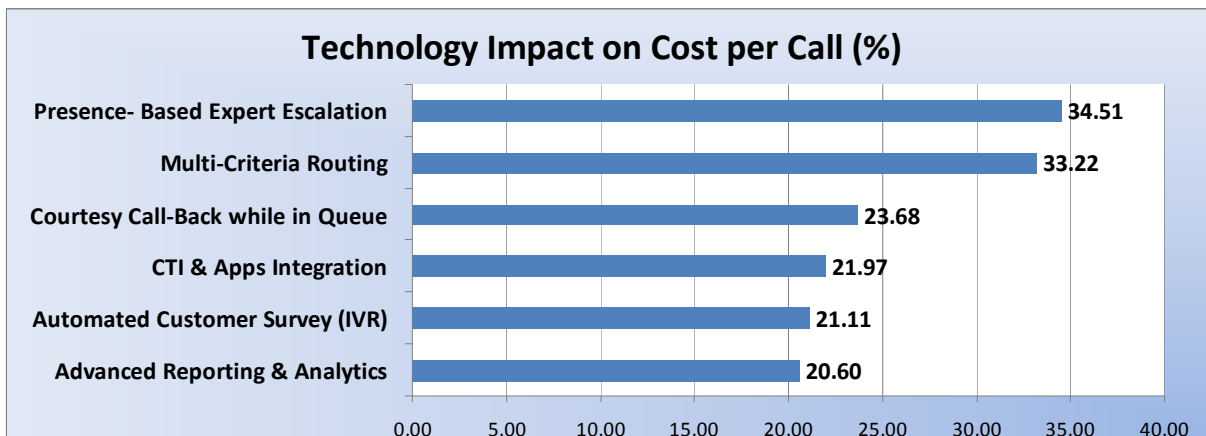


Figure 8: Technology Impact on Cost per Call (%)

These results indicate that more advanced and uncommon technologies, such as Multi-criteria Routing (34.5% positive impact on cost per call) and Presence-Based Expert Escalation (33.2% positive impact on cost per call), deserve notice and consideration by contact center managers. While this list does not include all technologies that we might expect would have an impact on

cost per call, it is focused on technologies that are found in the last four groups (or "silos") of technologies (indicated in Figure 1 above, the Contact Center Maturity Model), which are the silos in which most contact center costs are found.

At an average cost per call of \$5.05 for the sample group included in our study, a savings on the order of 20% is \$1.10. In a call center handling 1,000,000 calls per year, this would be a savings of over one million dollars - the sort of savings that could provide an attractive ROI after figuring the costs of new technology.

Note that the results above are at the 70% confidence level or above, except for the CTI Apps Integration result, which is at a 95% confidence level. Therefore, the research team considers it prudent to moderate expected outcomes, which nonetheless could be quite dramatic.

Customer Satisfaction

In this data cut, top box customer satisfaction (which is defined as receiving 5 out of 5 score on the question "Overall, how satisfied were you with your interaction"), was positively affected by the following technologies:



Figure 9. Technology Impact on Customer Satisfaction Top Box (%)

Note that customer satisfaction is a metric that is gathered by only 62.98% of the respondents. However, for centers that gather such data, there is an interesting mix of technologies in centers that report higher rates of satisfaction, as shown above. Centers that use Workforce Management technology to staff properly and that take an "eyes wide open" approach to operations review (with cradle to grave reporting and data analytics) are those that fare best. This corresponds with our experience in assessing centers: operations that continually manage to numbers have customer satisfaction high on their dashboard of metrics. They regularly tweak their processes to see how they can improve their satisfaction scores by trying new approaches and measuring results.

By using the above technologies, call centers can, on average, expect improvements in their Top Box Customer Satisfaction between 4% and 7%. Given that the average Top Box Caller Satisfaction was 69.85% in our study, a 4% to 7% boost would bring the average over the 70% mark.

For specific information please refer to Appendix C.

Bottom Box Customer Satisfaction showed a reduction in levels of dissatisfaction by applying the following technologies:



Figure 10. Technology Impact on Customer Satisfaction Bottom Box (%)

While the technologies indicated show positive impacts at a 70% confidence level, the impacts are considerable in percentage terms. This metric shares Workforce Management in common with Top Box Customer Satisfaction. Speech recognition, which is a much discussed and somewhat controversial technology, tops the list of technologies here, but not for Top Box Satisfaction. We can reasonably infer that, due to major improvements in this technology in recent years, this self-service technology, while not always creating top box ratings, is preferred to the alternative (longer wait times) and prevents customers from slipping to the very dissatisfied level. Call recording and retrieval helps centers identify and correct agent behaviors which can cause bottom box dissatisfaction.

We wish to point out that Bottom Box Satisfaction levels are usually low numbers; the average for the participants in this study was 3.34%. Therefore a 30% difference in results translates into a 1% reduction, from 3.34% to 2.34%.

Agent Satisfaction

In this study, top box agent satisfaction was positively affected by the following technologies:

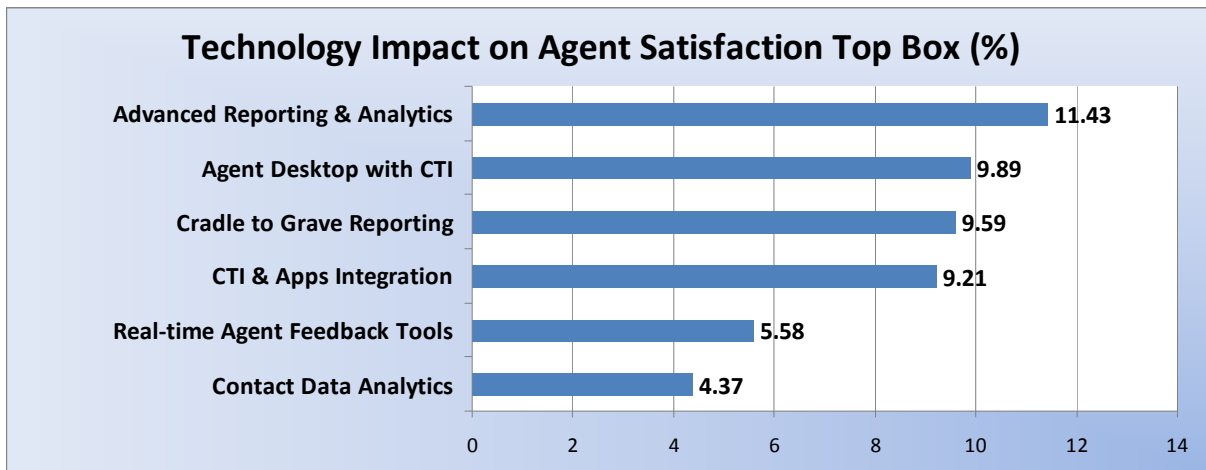


Figure 11. Technology Impact on Agent Satisfaction Top Box (%)

Several technologies were shown to have a positive effect on agent satisfaction. These data support the experiential conclusions of BenchmarkPortal consultants that agent satisfaction can have an important "canary in the coal mine" (or canary in the contact center) function when it comes to contact center technology, as energy and oxygen can be sucked out of your center by poor agent morale. High agent satisfaction is a reliable indicator that the center has optimized people, processes and technology, and that the operations are really working well.

The data indicate that where there are technologies that make information and feedback available to the agents, the agents are more satisfied. CTI desktop and apps integrations both enable the agent to better serve the client with confidence. Customers are less likely to be irritated when they connect to an agent if they know all along what the wait time in queue is. Having good reporting, and especially real-time agent feedback technology tools, helps the center to have a dashboard of the information that managers can monitor and that agents need to have and want to see. Agents are empowered to improve their own performance and feel more in control of their professional lives when these technologies are available.

Calls per Hour

Calls per Agent per Hour is a key productivity metric that is followed by managers in most reasonably sophisticated centers. Even in situations where management has made a conscious

decision not to pressure agents to reduce talk time, there remains a desire to fit as many good calls as possible into each hour an agent spends plugged into the system.

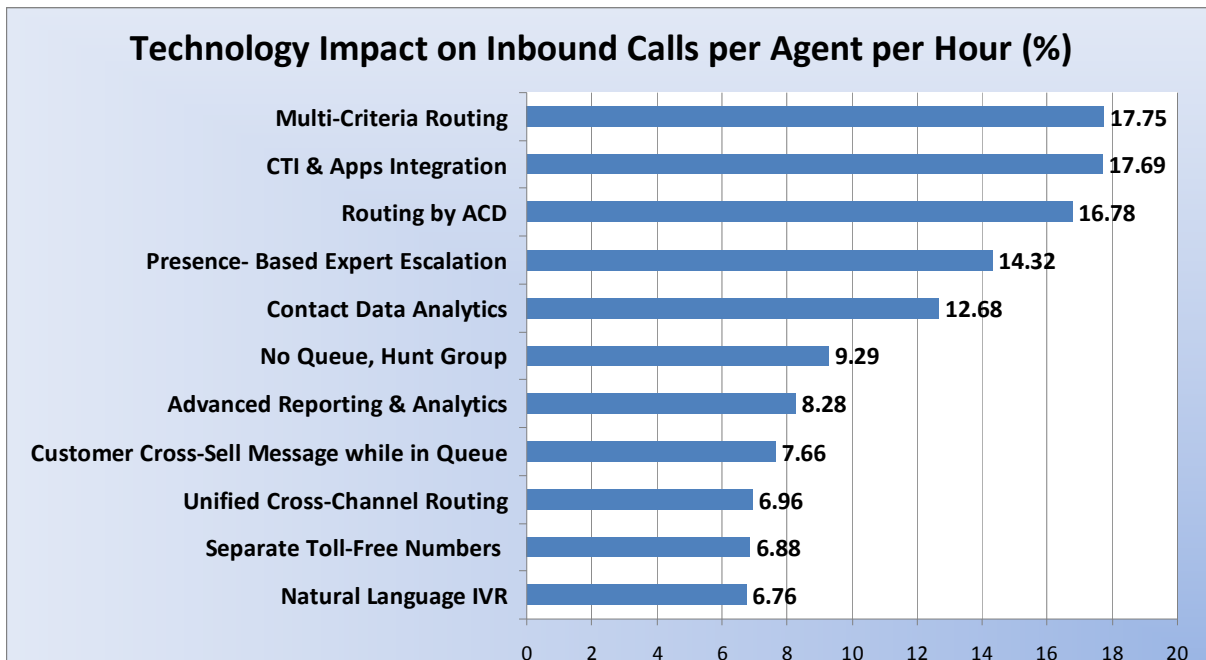


Figure 12: Technology Impact on Inbound Calls per Agent per Hour (%)

Numerous technologies showed a positive impact on this metric, with results varying from over 6% to just under 18% - - amounts that can have a major impact on cost of operations and provide justification for investment in technology.

A hypothetical increase of 10%, from 7 calls per agent per hour to a sustainable 7.7 calls per agent per hour, would have an important effect on productivity and financial performance for the center.

Queue Time

Naturally, the biggest impact on queue time is the staffing levels of the center; the more agents there are, the faster customers will be served. However, the right technologies can help expedite call handling and therefore reduce irritating and sometimes costly queue times without an increase in resources.

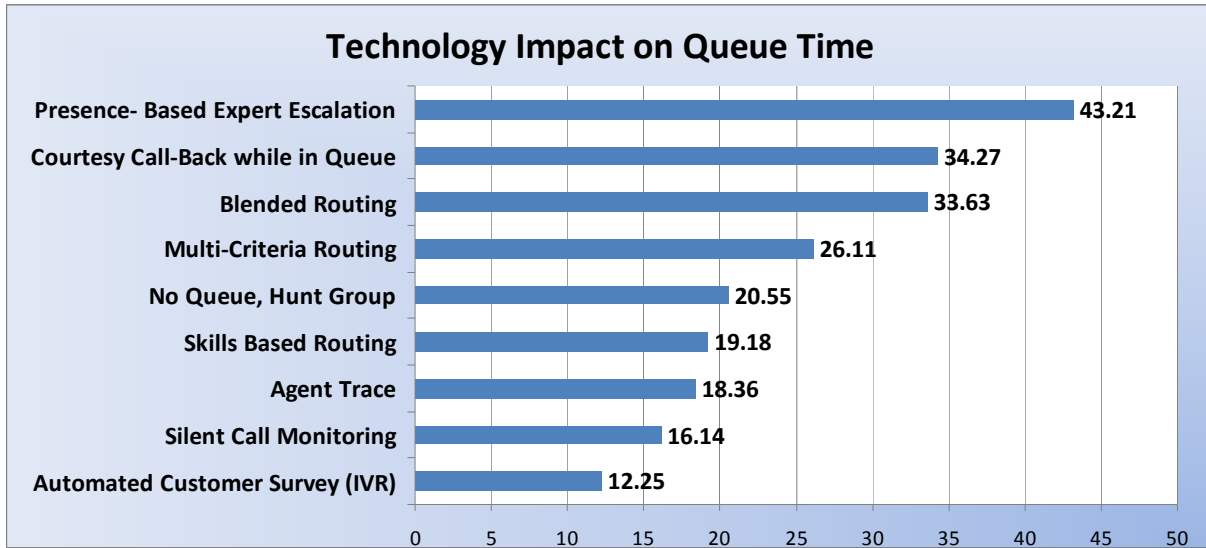


Figure 13. Technology Impact on Queue Time

Logically, courtesy callback functionality can improve queue time substantially, since it provides the caller with an alternative to waiting in queue. However, several other technologies that involve improved routing of calls and expedited escalation of calls also are found in centers which reported significantly better queue times than those without the technologies.

First Contact Resolution E-mail

With more centers becoming multi-channel, managers are paying closer attention to the service and the costs associated with e-mail responses.

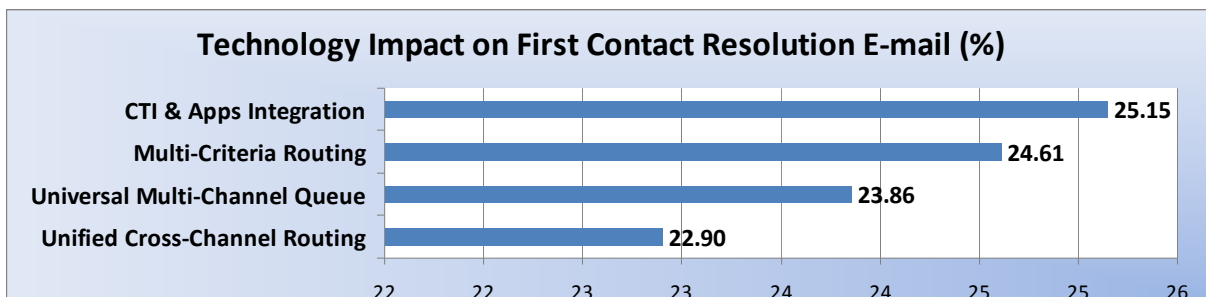


Figure 14. Technology Impact on First Contact Resolution E-mail (%)

Not surprisingly, the research found that the biggest boosts to first contact resolution for the e-mail channel came from advanced universal queuing and routing technologies, as well as applications to bring information to the agent desktop.

Cost per Contact: E-mail

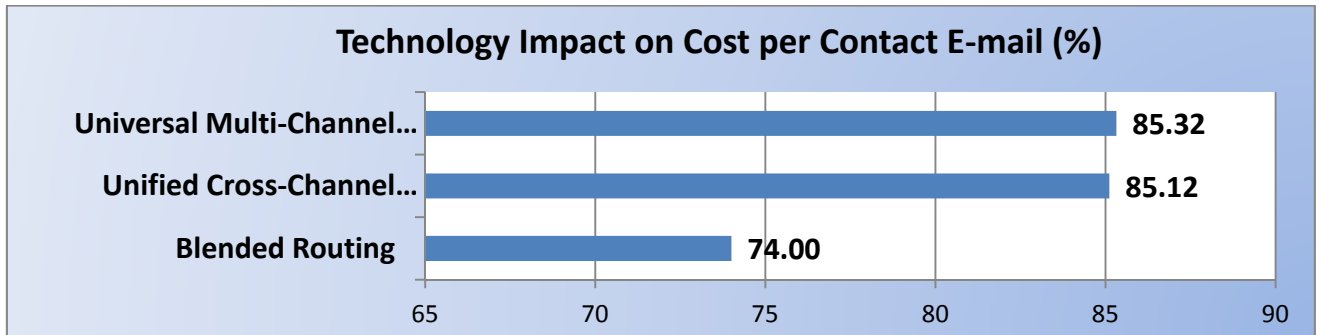


Figure 15. Technology Impact on Cost per Contact Email (%)

The data indicate that advanced multi-channel routing and queuing have a major impact on costs for e-mail handling. This means that centers which have large or growing e-mail traffic would do well to investigate this enabling technology so as to improve their cost structure in an important way.

Chat

As chat volumes increase in many centers, the cost for handling these interactions becomes more of a concern.

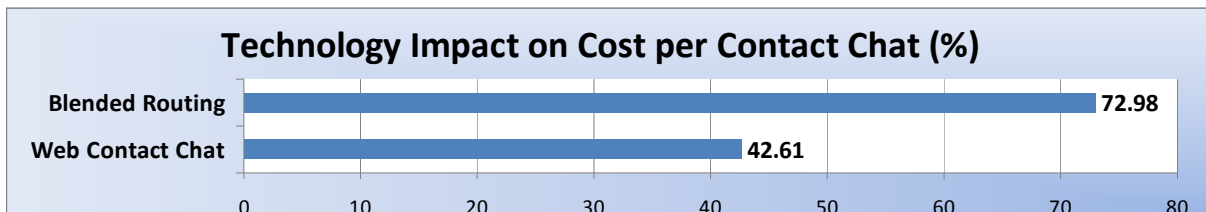


Figure 16. Technology Impact on Cost per Contact – Chat (%)

The same things indicated above for the e-mail channel can be said for the chat channel. While the techniques for measuring cost per chat are still less mature than the equivalent for the voice channel, managers should still consider new technology and the effect it will have on them financially.

First Contact Resolution - Chat

Several technologies were shown to have a positive effect on first contact resolution:

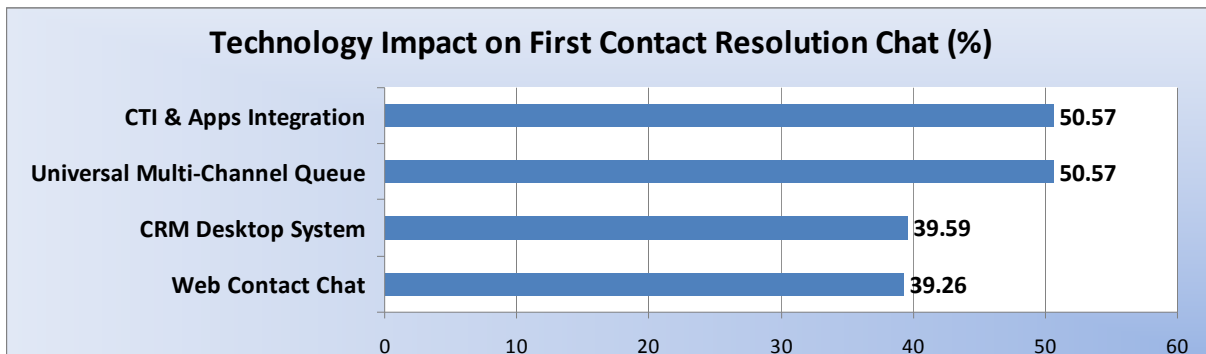


Figure 17. Technology Impact on First Contact Resolution Chat (%)

The results indicate that having a proper Web contact chat system, along with information that brings needed information to the chat agent (CTI & Apps Integration and CRM Desktop System) allow the agent to fully service the chat customer and better resolve the inquiry on the first interaction.

COMBINED EFFECT RESULTS

Correlating two key metrics against each other produced some interesting findings. Though generally not strong statistically, the correlations were directionally important and can be seen in Figure 18.

Cost per Call vs. Customer Satisfaction

The data shows a small negative correlation (-0.24) between Cost per Call and Customer Satisfaction. The negative sign supports the hypothesis that by using technology call centers can lower their Cost per Call while improving their Customer Satisfaction.

First Call Resolution vs. Customer Satisfaction

There is a small positive correlation (0.33) between First Call Resolution and Customer Satisfaction. The positive sign indicates that by using technology call centers can improve First Call Resolution and Customer Satisfaction at the same time.

Cost per Call vs. First Call Resolution

Cost per Call and First Call Resolution are negatively correlated (-0.25). Though the value of the correlation coefficient is small, the negative sign supports the hypothesis that by using technology call centers can lower their Cost per Call while improving their FCR.

Customer Satisfaction vs. Agent Satisfaction

Finally, a weak correlation (0.12) exists between Customer Satisfaction and Agent Satisfaction. The positive sign implies that these metrics go hand in hand.

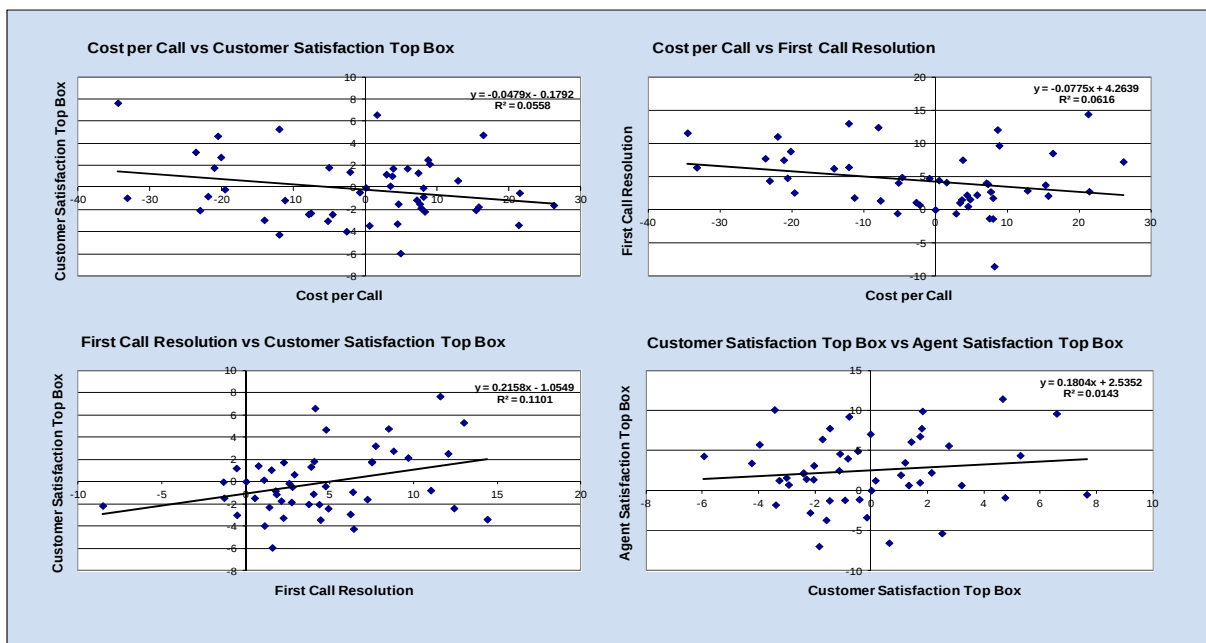


Figure 18. Combined Effects Analyses

CONCLUSIONS FROM THE RESEARCH

This research represents the first of its kind to correlate technology with contact center performance across a large number of centers. We expect that more research will be sparked by this initiative and that additional valuable insights will be uncovered in future studies. We know from experience that centers which have certain technologies do not always deploy them optimally, and a future research project may delve more into the utilization of technology.

The methodology used for this initial study was powerfully straightforward and matched the nature of the information. We did not ask managers for their opinions, feelings, plans or experiences regarding technology. We asked them only for their data - data on their center's technology and data on their center's performance.

The results of the study indicate that more mature levels of technology drive better performance on important contact center metrics. For instance, they:

- Increase First Contact Resolution
- Increase Average Calls Handled
- Lower Cost per Call
- Decrease Queue Time
- Improve Caller Satisfaction
- Increase Agent Satisfaction

The technologies that align or correlate statistically with individual metrics come from across the Contact Center Maturity Model spectrum. Certainly, we do not always see the expected technologies leading the list for a specific metric, and we sometimes see technologies that seem to have little in common with a metric nonetheless statistically associated with it. Overall, however, the data clearly indicate that more advanced technologies improve both the efficiency and effectiveness of contact centers. Technologies that ensure proper staffing, ensure proper connection and recognition of inquiries, promote proper routing, queuing and resolution / escalation of contacts, and provide reporting and analytics to both agents and management, are potent enablers of superior performance.

While investments in technology must always be analyzed and tracked individually to determine operational and financial benefit, this research provides a positive, statistically relevant backdrop that favors investing in technological maturity to improve contact center financial and quality performance.

APPENDIX A - BIOGRAPHIES



Bruce Belfiore is Senior Research Executive, Center for Customer-Driven Quality™ and CEO of BenchmarkPortal (www.benchmarkportal.com). BenchmarkPortal provides best practices reports, research and consulting to the customer contact industry worldwide.

Bruce first became involved in the contact center sector over a decade ago. He joined BenchmarkPortal in 2000. Bruce is the author of numerous white papers and the books *Benchmarking for Profits!*, a manual for best practices contact center benchmarking, as well as its sequel, *Benchmarking at its Best for Contact Centers*. He is currently working on another book, *Shareholder Value and Customer Contact*.

Bruce is Dean of the College of Call Center Excellence (www.benchmarkportal.com/call-center-training), which provides courses to contact center managers and supervisors. He is also the host of the internet radio talk show *CallTalk*, (www.benchmarkportal.com/call-center-newsresources/calltalk-online-radio-show) which explores contact center topics with industry experts.

He is co-inventor of a patent for a symbolic language system, Simbly™, with important contact center applications. He has taught the Call Center management course at Purdue University with Professor Richard Feinberg.

Bruce has divided his career between North America and Europe, and has fulfilled work assignments in Asia and Africa as well. He previously worked in the finance sector with international commercial and investment banks and with the Bain & Co. Management Consulting group in Italy. While in Europe, Bruce was also a speaker and writer on business topics in English and Italian.

Bruce holds an A.B. degree from Harvard College, a J.D degree from Harvard Law School, and an M.B.A. degree from Harvard Business School, where he also attended the HBS Entrepreneur's Tool Kit program in 2000. He has published numerous articles and has been a featured speaker in both English and Italian on a variety of business topics.

Bruce can be reached at BruceBelfiore@BenchmarkPortal.com.



John Chatterley is a Senior Consultant and Director of Research and Analysis for BenchmarkPortal, specializing in contact center performance research, analysis, technical writing, and content editing. John has published numerous customized benchmarking reports, research reports, One-Minute™ Survey reports, and White Papers.

John is editor, writer and analyst of BenchmarkPortal's annual series of 48 detailed industry reports covering the spectrum of contact center industry sectors, and chief editor and analyst of BenchmarkPortal's series of One-Minute™ Surveys. He authored a comprehensive White Paper study entitled "Improving Contact Center Performance through Optimized Site Selection." John has shared his contact center expertise with numerous clients, both domestically and internationally. He is a faculty member with the College of Call Center Excellence.

John co-authored or edited numerous books with Dr. Jon Anton, including:

1. *Coaching Call Center Agents*
2. *Defining Customer Care*
3. *Automated Self-Service Using Speech Recognition*
4. *Listening to the Voice of the Customer*
5. *Contact Center Management by the Numbers*
6. *Offshore Outsourcing Opportunities*
7. *Selecting a Teleservices Partner*
8. *Interpreting the Voice of the Customer*

John's professional career spans more than 25 years of experience in call center management and consulting. John designed, implemented, staffed and managed three 500+ seat contact center sites in Arizona, Nevada, and California, and has extensive call center operational management experience. He possesses firsthand experience at all levels of a contact center including front-line technical support agent, supervisor, team lead, analyst, designer, call center manager, and operations director.

John is a Certified Contact Center Auditor, Certified Call Center College Instructor, BenchmarkPortal Certified Benchmarking Instructor and Analyst. John's professional education was in Electrical Engineering & Computer Science at Southern Utah University and the University of Utah.

John can be reached at JohnChatterley@BenchmarkPortal.com



Dr. Natalie Petouhoff is a Research Executive at the Center for Customer-Driven Quality (founded at Purdue University) and BenchmarkPortal, which serves the contact center industry with advanced benchmarking, certification, research and education.

Natalie, author of four business books, has been speaking about customers, companies and the bottom line for 20 years. As the Director of the UCLA Executive Education Program and an instructor for Social Media, she guides companies as a business strategist to understand where the potential is and how to lead companies to greater success.

Natalie's unique perspective on business and thought leadership is currently being applied to social media, as she helps companies learn how to use it to increase the bottom line. Her social media assessments and ROI calculators provide tactical strategies, planning and real-world execution capabilities.

Natalie's work and White Papers are the subject of hundreds of articles in publications like *USAToday*, *Adage*, *BusinessWeek*, *Fast Company*, *The New York Times*, *The Wall Street Journal*, *Peppers and Rogers 1-to-1 Magazine* and *CRM Magazine* as well as national television and radio.

President of the Los Angeles Social Media Club, Natalie has held positions as a Forrester analyst, chief strategist for a Weber Shandwick PR/Marketing Agency, management consultant at PWC and Hitachi and in management at Hughes Electronics, GM and GE.

Her focus includes helping clients to drive revenue and profits, develop social business strategies and tactical plans as well as creating training programs for leadership, employee motivation and organizational change. Natalie also teaches PR, Marketing and Leadership courses at the University of Southern California and Pepperdine University.

Natalie can be reached at NataliePetouhoff@BenchmarkPortal.com. Examples of her work are available at:

Ebook: [Social Media ROI](#) Myths and Truths

YouTube Videos: [On ROI of Social Media](#)

White Papers: [Social Media ROI](#)

New Book on Facebook: [Like My Stuff - How to Monetize Your Facebook Fans With Social Commerce & A Facebook Store](#)

Twitter: [@drnatalie](#)

LinkedIn: [DrNataliePetouhoff](#)

website/blog: www.drnatalienews.com/blog

G+ : [Google Plus posts](#)



Angel Tonchev first collaborated as a statistical analyst with BenchmarkPortal almost a decade ago. With his brother, Christo, he is a co-developer of the Tonchev Performance Index for call centers, originally developed for the Center for Customer-Driven Quality at Purdue University and still utilized by BenchmarkPortal. He has more than ten years of benchmarking experience in a variety of industries, including call centers, oil and gas, procurement and information technologies.

Angel is a manager and co-founder of Performathics, LLC – a consulting company specializing in mathematical modeling and statistical analyses for businesses. Angel is also a co-inventor of the Juran Hydrocarbons Index, which is widely used to measure the operational performance of assets throughout the entire oil and gas value chain.

He holds a master's degree in Economics from Maastricht University (the Netherlands), a bachelor's degree in Business from Sofia University (Bulgaria) and an Engineering degree from the Technical University in Sofia. He is a certified Six Sigma Black Belt and a certified Call Center Auditor. Additionally, Angel is a co-author of several academic articles and has publications in leading industry journals (*Oil & Gas Journal*) and business books (*Juran Quality Handbook, 6th edition*).



Christo Tonchev first collaborated as a statistical analyst with BenchmarkPortal almost a decade ago. With his brother, Angel, he is a co-developer of the Tonchev Performance Index for call centers, originally developed for the Center for Customer-Driven Quality at Purdue University and still utilized by BenchmarkPortal.

Christo is a Manager and Co-founder of Performathics, LLC – a consulting company specializing in mathematical modeling and statistical analyses for businesses. He has more than ten years of benchmarking experience in a variety of industries, including call centers, oil and gas, procurement and information technologies. Christo is also a co-inventor of the Juran Hydrocarbons Index, which is widely used to measure the operational performance of assets throughout the entire oil and gas value chain.

Christo holds a master's degree in Economics from Maastricht University (the Netherlands) and a bachelor's degree in Business from Sofia University (Bulgaria). In addition, he studied at the Higher Institute of Physical Culture (Bulgaria). He is a certified Six Sigma Black Belt and a certified Call Center Auditor. Christo is an author of several academic articles and has publications in leading industry journals (*Oil & Gas Journal*) and business books (*Juran Quality Handbook, 6th edition*).



Dee Buell has over 20 years of Call Center management experience in the financial industry. She has managed and operated inbound and outbound service teams, as well as inbound and outbound sales teams.

As a Senior Business Consultant, Dee is a Certified Auditor and a call center subject matter expert (SME) with a focus on Quality Management. She has experience in building a quality management system that uses agent performance metrics, customer satisfaction analysis, and customer relationship management (CRM) data to drive an effective and efficient customer experience.

She managed the quality and training teams for MetLife Insurance, with a staff of 1200+ agents, both in-house and outsourced. The training team supported 17 different call groups in six sites across the United States and in three sites offshore. Customized training curriculum, online training tools, and virtual technology were used to insure consistency in the virtual call center environment.

She can be reached at DeeBuell@BenchmarkPortal.com

APPENDIX B – SPEARMAN’S CORRELATION TABLES

Spearman’s rank correlation is a non-parametric statistical test which measures the statistical relationship between two variables. Spearman’s rank correlation coefficient (ρ) varies between -1 and 1. The sign of the coefficient indicates the direction of association between the variables. If one of the variables tends to increase when the other one increases, the Spearman correlation coefficient is positive. In contrast, if one of the variables tends to decrease when the other one increases, the Spearman correlation coefficient is negative. A Spearman correlation of zero indicates that there is no relationship between the variables.

Please note that for some KPIs a negative correlation between these metrics and the technology may imply a positive impact. For example, the AUX Time and Technology Index have a negative correlation coefficient (-0.15). This indicates that as the technology increases the actual AUX Time decreases. Since the shorter AUX Time is better for the contact centers, the overall impact of technology on this particular metric is positive.

Note: Green cells indicate statistical significance at 95% confidence level.; Yellow cells add the statistically significant correlations at 80% confidence level.

Spearman's Correlation: All Industries		
Variables	Correlation coefficient (ρ)	Probability (p)
	Technology Index	
AUX Time	-0.1503	0.107
Agent Utilization	0.0993	0.177
Average Calls per Hour	0.1848	0.012
Agent to Supervisor Ratio	0.1353	0.110
Calls Resolved on First Call	0.2137	0.008
Top Box Agent Satisfaction	0.1859	0.002

Spearman's Correlation: Bank Industry		
Variables	Correlation coefficient (rho)	Probability (p)
	Technology Index	
Performance Index	0.8857	0.047
Efficiency Score	1.0000	0.025
Cost per Call	-0.7827	0.089
Average Talk Time	-0.6000	0.177
Average After Call Work Time	-0.8857	0.047
Agent Occupancy	0.8286	0.063
Adherence to Schedule	0.6957	0.116
Agent Attendance	0.7590	0.084
Agent to Supervisor Ratio	0.8208	0.097
Annual Turnover FTA	0.8000	0.165
Average Speed of Answer 80%	-0.6000	0.177
Average Speed of Answer	-0.6000	0.177
Average Hold Time	0.8286	0.063
Abandoned Calls	-0.7714	0.084
Customer Satisfaction Top Box	1.0000	0.025

Note: Green cells indicate statistical significance at 95% confidence level. Yellow cells add the statistically significant correlations at 80% confidence level.

Spearman's Correlation: Financial Industry		
Variables	Correlation coefficient (rho)	Probability (p)
	Technology Index	
Performance Index	0.6530	0.038
Efficiency Score	0.6758	0.032
Effectiveness Score	0.5662	0.072
Agent Utilization	0.4136	0.174

Spearman's Correlation: Insurance Industry		
Variables	Correlation coefficient (rho)	Probability (p)
	Technology Index	
Performance Index	0.5018	0.007
Efficiency Score	0.4568	0.013
Effectiveness Score	0.4416	0.016
Average Talk Time	-0.3130	0.129
Average After Call Work Time	-0.4144	0.041
Agent Occupancy	0.2353	0.180
Agent Attendance	0.2676	0.134
Agent Utilization	-0.2953	0.159
Average Calls per Hour	0.5171	0.005
Annual Turnover FTA	-0.3354	0.110
Average Speed of Answer 80%	-0.6333	0.002
Average Speed of Answer	-0.6333	0.002
Average Queue Time	0.3520	0.051
Abandoned Calls	-0.2787	0.187
Calls Resolved on First Call	0.4379	0.017
Customer Satisfaction Top Box	0.3340	0.064
Top Box Agent Satisfaction	0.3712	0.037

Note: Green cells indicate statistical significance at 95% confidence level. Yellow cells add the statistically significant correlations at 80% confidence level.

Spearman's Correlation: Large Call Centers (Calls Handled >801498)		
Variables	Correlation coefficient (rho)	Probability (p)
	Technology Index	
Cost per Call	-0.2060	0.171
Adherence to Schedule	0.2414	0.082
AUX Time	-0.3204	0.043
Average Calls per Hour	0.1820	0.184
Calls Resolved on First Call	0.3751	0.010
Top Box Agent Satisfaction	0.2930	0.014

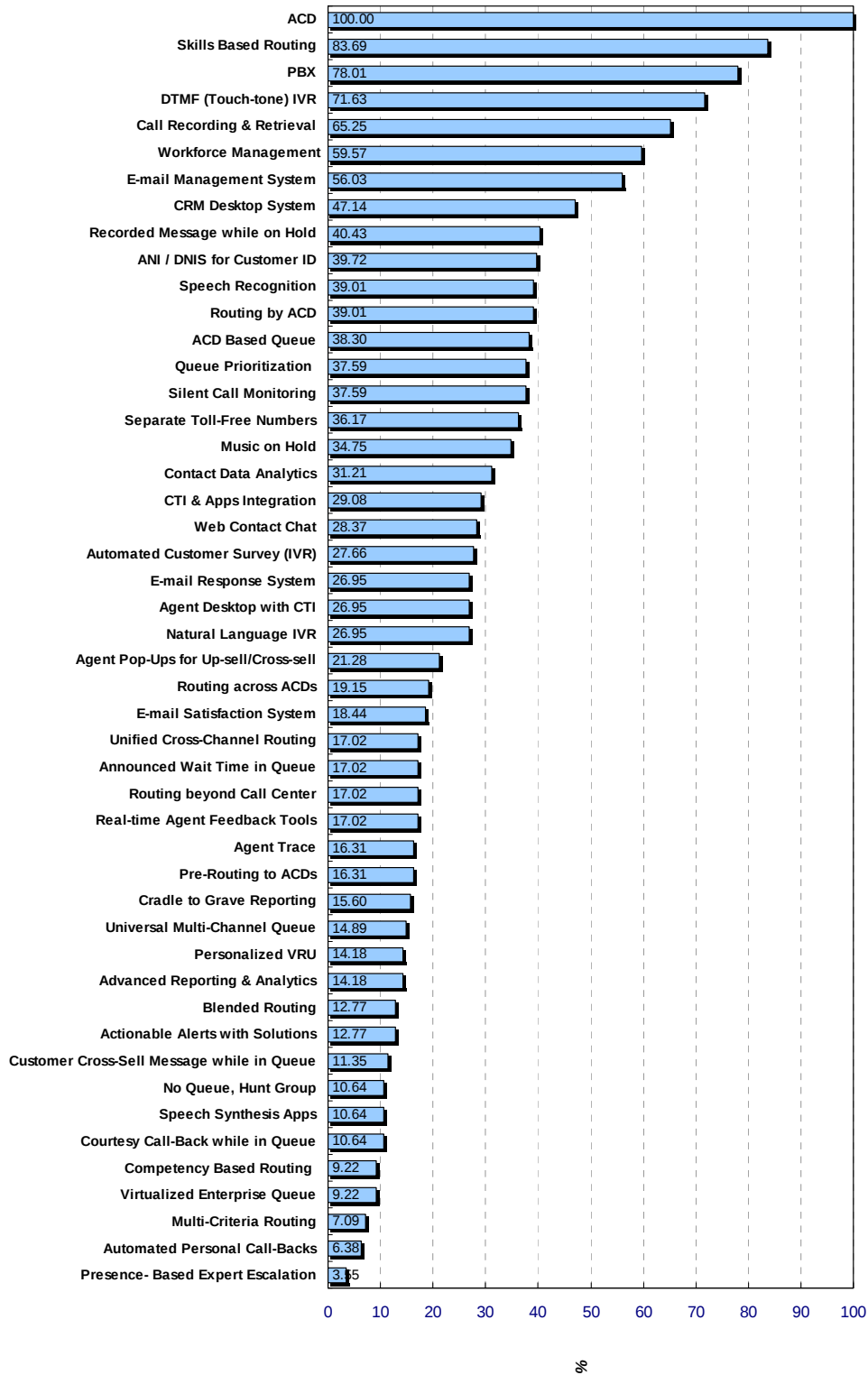
Spearman's Correlation: Medium Call Centers (Calls Handled <801498)		
Variables	Correlation coefficient (rho)	Probability (p)
	Technology Index	
Cost per Call	-0.2060	0.171
Adherence to Schedule	0.2414	0.082
AUX Time	-0.3204	0.043
Average Calls per Hour	0.1820	0.184
Calls Resolved on First Call	0.3751	0.010
Top Box Agent Satisfaction	0.2930	0.014

Spearman's Correlation: Small Call Centers (Calls Handled <146001)		
Variables	Correlation coefficient (rho)	Probability (p)
	Technology Index	
Cost per Call	0.2744	0.057
Average Talk Time	0.2518	0.080
Adherence to Schedule	-0.2376	0.171
Average Hold Time	-0.2124	0.180
Abandoned Calls	0.2246	0.114
Customer Satisfaction Bottom Box	0.2679	0.126

APPENDIX C – TECHNOLOGY DRILL-DOWN CHARTS AND TABLES

Technology drill-down analyses are based on unpaired two sample t-tests. The t-test is a statistical analysis that looks at one variable (one KPI) and assesses whether the means of two groups (i.e. a group which has a given technology and one without it) are *statistically* different from each other. The most important results from the t-test are the p-value, relative difference (size of the difference between the means in percentage terms) and confidence interval. In this regard, when interpreting the results from the tables below, the smaller p-values and higher relative differences will indicate that the KPI averages of the samples with and without a specific technology differ significantly. Therefore, we can conclude that this technology has an impact on the KPI. If the relative difference has a negative sign this implies that the technology decreases the KPI value (not necessarily an indication for negative impact).

Technology Adoption



Technologies With A Positive Impact On Cost Per Call (CPC)

Technology	Relative Difference between Means (%)	P value	The mean of Group "Yes" minus Group "No"	95% CI Lower Limit	95% CI Upper Limit	Mean "Yes" Group	Mean "No" Group
CTI Apps Integration	-21.97	0.043	-1.42	-2.79	-0.05	5.03	6.45
Automated Customer Survey (IVR)	-21.11	0.057	-1.35	-2.75	0.04	5.06	6.41
Multi-Criteria Routing	-33.22	0.098	-2.05	-4.49	0.38	4.13	6.18
Real-time Agent Feedback Tools	-20.17	0.137	-1.26	-2.93	0.41	4.99	6.25
Customer Cross-Sell Message while in Queue	-23.08	0.155	-1.43	-3.41	0.55	4.77	6.20
Courtesy Call-Back while in Queue	-23.68	0.156	-1.47	-3.50	0.57	4.73	6.19
Advanced Reporting & Analytics	-20.60	0.161	-1.28	-3.08	0.52	4.94	6.22
Presence- Based Expert Escalation	-34.51	0.222	-2.11	-5.51	1.29	4.00	6.11
Routing by ACD	-12.06	0.243	-0.76	-2.05	0.52	5.57	6.33
Contact Data Analytics	-12.06	0.272	-0.76	-2.11	0.60	5.52	6.27
Automated Personal Call-Backs	-19.62	0.359	-1.20	-3.78	1.38	4.91	6.11
Universal Multi-Channel Queue	-11.27	0.441	-0.69	-2.46	1.08	5.45	6.14
Natural Language IVR	-7.65	0.513	-0.47	-1.89	0.95	5.69	6.16
Skills Based Routing	-7.95	0.552	-0.51	-2.22	1.19	5.95	6.47
Agent Desktop with CTI	-5.14	0.663	-0.31	-1.74	1.11	5.81	6.12
Pre-Routing to ACDs	-4.64	0.744	-0.28	-1.99	1.43	5.80	6.08
Routing beyond Call Center	-2.20	0.876	-0.13	-1.81	1.55	5.93	6.06
Silent Call Monitoring	-0.85	0.938	-0.05	-1.36	1.25	6.00	6.06

95% Confidence Level 70% Confidence Level

Technologies With A Positive Impact On First Call Resolution (FCR)

Technology	Relative Difference between Means (%)	P value	The mean of Group "Yes" minus Group "No"	95% CI Lower Limit	95% CI Upper Limit	Mean "Yes" Group	Mean "No" Group
Contact Data Analytics	12.99	0.000	0.10	0.05	0.15	0.83	0.74
PBX	14.83	0.001	0.10	0.04	0.16	0.79	0.69
Call Recording & Retrieval	12.06	0.001	0.09	0.04	0.13	0.79	0.71
CTI Apps Integration	11.02	0.002	0.08	0.03	0.13	0.82	0.74
Skills Based Routing	12.41	0.010	0.09	0.02	0.15	0.78	0.69
Workforce Management	8.50	0.013	0.06	0.01	0.11	0.79	0.73
Web Contact Chat	7.50	0.039	0.06	0.00	0.11	0.81	0.75
Automated Customer Survey (IVR)	7.50	0.041	0.06	0.00	0.11	0.81	0.75
Real-time Agent Feedback Tools	8.80	0.043	0.07	0.00	0.13	0.82	0.75
DTMF (Touch-tone) IVR	7.23	0.054	0.05	0.00	0.11	0.78	0.73
Routing by ACD	6.42	0.058	0.05	0.00	0.10	0.79	0.75
E-mail Management System	6.22	0.064	0.05	0.00	0.09	0.79	0.74
Competency Based Routing	9.67	0.085	0.07	-0.01	0.16	0.83	0.76
Courtesy Call-Back while in Queue	7.72	0.143	0.06	-0.02	0.14	0.82	0.76
Silent Call Monitoring	4.74	0.163	0.04	-0.01	0.09	0.79	0.75
Presence- Based Expert Escalation	11.58	0.187	0.09	-0.04	0.22	0.85	0.76
Pre-Routing to ACDs	4.90	0.267	0.04	-0.03	0.10	0.80	0.76
Agent Desktop with CTI	4.06	0.271	0.03	-0.02	0.09	0.79	0.76
Announced Wait Time in Queue	4.44	0.306	0.03	-0.03	0.10	0.79	0.76
Advanced Reporting & Analytics	4.76	0.308	0.04	-0.03	0.11	0.80	0.76
Multi-Criteria Routing	6.37	0.315	0.05	-0.05	0.14	0.81	0.76
Cradle to Grave Reporting	4.12	0.359	0.03	-0.04	0.10	0.79	0.76
CRM Desktop System	2.88	0.384	0.02	-0.03	0.07	0.78	0.75
Customer Cross-Sell Message while in Queue	4.36	0.395	0.03	-0.04	0.11	0.79	0.76
Agent Trace	3.74	0.397	0.03	-0.04	0.09	0.79	0.76
Blended Routing	4.02	0.409	0.03	-0.04	0.10	0.79	0.76
Speech Recognition	2.71	0.420	0.02	-0.03	0.07	0.78	0.76
Music on Hold	2.76	0.423	0.02	-0.03	0.07	0.78	0.76
Speech Synthesis Apps	3.87	0.463	0.03	-0.05	0.11	0.79	0.76
ACD Based Queue	2.10	0.531	0.02	-0.03	0.07	0.77	0.76
Agent Pop-Ups for Up-sell/Cross-sell	2.22	0.575	0.02	-0.04	0.08	0.78	0.76
Unified Cross-Channel Routing	2.24	0.604	0.02	-0.05	0.08	0.78	0.76
ANI / DNIS for Customer ID	1.57	0.638	0.01	-0.04	0.06	0.77	0.76
Universal Multi-Channel Queue	1.81	0.693	0.01	-0.05	0.08	0.78	0.76
Automated Personal Call-Backs	2.57	0.699	0.02	-0.08	0.12	0.78	0.76
Personalized VRU	1.76	0.705	0.01	-0.06	0.08	0.78	0.76
Natural Language IVR	1.38	0.707	0.01	-0.04	0.07	0.77	0.76
Actionable Alerts with Solutions	1.51	0.757	0.01	-0.06	0.08	0.78	0.76
E-mail Response System	1.10	0.766	0.01	-0.05	0.06	0.77	0.76
Routing across ACDs	1.06	0.798	0.01	-0.05	0.07	0.77	0.76
Routing beyond Call Center	0.73	0.866	0.01	-0.06	0.07	0.77	0.76
Virtualized Enterprise Queue	0.51	0.928	0.00	-0.08	0.09	0.77	0.76

95% Confidence Level 70% Confidence Level

Technologies With A Positive Impact On Customer Satisfaction Top Box (CSTB)

Technology	Relative Difference between Means (%)	P value	The mean of Group "Yes" minus Group "No"	95% CI Lower Limit	95% CI Upper Limit	Mean "Yes" Group	Mean "No" Group
Contact Data Analytics	5.29	0.207	0.04	-0.02	0.09	0.70	0.67
Cradle to Grave Reporting	6.58	0.217	0.04	-0.03	0.11	0.72	0.67
Workforce Management	4.75	0.237	0.03	-0.02	0.08	0.69	0.66
Advanced Reporting & Analytics	4.66	0.398	0.03	-0.04	0.11	0.71	0.68
Presence- Based Expert Escalation	7.65	0.461	0.05	-0.09	0.19	0.73	0.68
Call Recording & Retrieval	2.51	0.540	0.02	-0.04	0.07	0.69	0.67
Real-time Agent Feedback Tools	2.75	0.591	0.02	-0.05	0.09	0.70	0.68
Courtesy Call-Back while in Queue	3.20	0.608	0.02	-0.06	0.11	0.70	0.68
Agent Desktop with CTI	1.82	0.675	0.01	-0.05	0.07	0.69	0.68
Automated Customer Survey (IVR)	1.79	0.677	0.01	-0.05	0.07	0.69	0.68
Web Contact Chat	1.73	0.688	0.01	-0.05	0.07	0.69	0.68
Unified Cross-Channel Routing	1.73	0.738	0.01	-0.06	0.08	0.69	0.68
Competency Based Routing	2.14	0.748	0.01	-0.07	0.10	0.69	0.68
Separate Toll-Free Numbers	1.20	0.766	0.01	-0.05	0.06	0.69	0.68
Routing beyond Call Center	1.42	0.782	0.01	-0.06	0.08	0.69	0.68
Speech Synthesis Apps	1.33	0.831	0.01	-0.07	0.09	0.69	0.68
Actionable Alerts with Solutions	1.05	0.856	0.01	-0.07	0.08	0.69	0.68
CRM Desktop System	0.63	0.870	0.00	-0.05	0.06	0.68	0.68
Routing across ACDs	0.15	0.976	0.00	-0.06	0.07	0.68	0.68

95% Confidence Level 70% Confidence Level

Technologies With A Positive Impact on Customer Satisfaction Bottom Box (CSBB)

Technology	Relative Difference between Means (%)	P value	The mean of Group "Yes" minus Group "No"	95% CI Lower Limit	95% CI Upper Limit	Mean "Yes" Group	Mean "No" Group
Speech Recognition	-66.48	0.023	-0.07	-0.13	-0.01	0.04	0.10
Call Recording & Retrieval	-48.16	0.099	-0.06	-0.12	0.01	0.06	0.11
Workforce Management	-47.49	0.106	-0.05	-0.11	0.01	0.06	0.11
DTMF (Touch-tone) IVR	-39.91	0.219	-0.04	-0.11	0.03	0.06	0.11
PBX	-38.91	0.268	0.04	-0.12	0.03	0.07	0.11
Advanced Reporting & Analytics	-46.12	0.338	-0.04	-0.12	0.04	0.04	0.08
Contact Data Analytics	-25.98	0.487	-0.02	-0.08	0.04	0.06	0.08
Actionable Alerts with Solutions	-31.70	0.548	-0.03	-0.11	0.06	0.05	0.08
Skills Based Routing	-25.92	0.598	-0.03	-0.12	0.07	0.07	0.10
Automated Customer Survey (IVR)	-19.20	0.644	-0.02	-0.08	0.05	0.06	0.08
CRM Desktop System	-2.86	0.942	0.00	-0.06	0.06	0.07	0.08

95% Confidence Level 70% Confidence Level

APPENDIX D - SURVEYS

Survey E-mail Invitation:

Technology & Performance Survey(TM)

Receive a complimentary copy of the White Paper & a chance to win an iPad!

Dear Call Center Professional:

We are excited to invite you to participate in an important research project from BenchmarkPortal and The Center for Customer Driven Quality (founded at Purdue University). The purpose of the study is to understand the correlation between level of technology and contact center performance, as measured through objective metrics.

You can find more information about this research study by watching our video HERE (<http://youtu.be/GCLduHvPZcl>)

Your participation will provide you with:

- *Free copy of the White Paper results*
- *A chance to win an iPad*
- *A free benchmark report and a read out of your individual benchmark report by one of our certified experts*

It's our way of showing our appreciation to you for your input.

The survey link below will benchmark your call center and ask you questions about your call center technology.

Please Take our 22KPI Benchmarking Survey Followed by the Cisco Sponsored Technology & Performance Survey: [\[invite \("survey link"\)\]](#)

Once completed you could either re-visit the survey link above to input data, e-mail to Jeffrobertson@BenchmarkPortal.com, or fax to 805-618-1557.

Thank you very much for your participation.

*Bruce Belfiore, CEO
BenchmarkPortal, LLC. &
Senior Research Executive
Center for Customer-Driven Quality*

Thank You!

Survey Questionnaire:

Contact Center Performance

1. How many inbound calls per year are directed to your call center?

Calls offered annually

(Calls offered is the total number of calls you receive in a given year. This number is provided by your ACD.)

2. Of the inbound calls directed to your call center, how many are handled by a live agent and/or your IVR?

Calls handled annually

(These are the total number of unique inbound calls received in a given year by the center that are completed by a live agent, plus those completed by your IVR. The value for calls handled must be equal to, or less than calls offered, and should be approximate to the value of calls offered less those abandoned. This number is often provided by your ACD.)

3. Of all the calls handled annually by your center, how many are handled by each of the following two categories?

Annual call volume handled by your agents

(These are the total number of unique inbound calls received in a given year by the center that are completed by a live agent. The sum of this value, when added to the sum of calls handled by the IVR, should equal the value for calls handled by the center. This number is often provided by your ACD.)

Annual call volume handled completely by your IVR

(These are the total number of unique inbound calls received in a given year by the center that are completed by your IVR. The sum of this value, when added to the sum of calls handled by agents, should equal the value for calls handled by the center. This number is often provided by your ACD.)

4. Of the calls handled annually by your agents how do they break down in the following two categories?

Business to business

%

This is the percentage of calls exchanged with other businesses as opposed to end-user (private) callers.)

Consumer to business

%

(This is the percentage of calls exchanged with end-user (private) callers as opposed to calls from businesses.)

Total 100%

5. How many agents work at your call center?

Full-time agents _____

(A full-time agent is considered as one who works 40 hours or more per week, or whatever equivalent used by your center. In some cases, full-time agents are counted at 36 hour per week. As this is an operational metric, the specific hours worked is less as important than the numbers of agents working in the capacity of a full-time agent.)

Part-time agents _____

(A Part-time agent is one who works a part-time schedule of less than 36 hours per week or whatever equivalent part-time cap is used by your center. In some cases, part-time agents are counted as agents that do not work more than 36 hour per week. As this is an operational metric, the specific hours worked is less as important than the numbers of agents working in the capacity of a part-time agent.)

6. How many Full Time Equivalent agents (FTE) work at your call center?

Full-Time Equivalents (FTEs) _____

(This is an operations and workforce metric that shows the amount of labor used in terms of full-time workforce. It is derived by adding the cumulative sum of labor hours for both full-time and part-time employees for a specified period and dividing its sum by 40.

Total FTE's = (total average hours of full-time agents + total average hours of part-time agents)/40

7. Are your agents represented by a labor union

Yes _____

No _____

(A legally recognized professional body organized for the purpose of supporting the needs of its members through the collective bargaining of wages, benefits, and working conditions.)

8. If your agents do more than just answer inbound calls, what other functions do they perform?

Agent Functions

Average Percentage of Agent Time

Outbound Calls

%

Respond to E-mails

%

Respond to On-line Web-chats

%

Other

%

9. Which of the following types of calls do your agents handle as a percentage of their total calls handled?

Customer Service	%
<i>(Providing callers with quick and accurate answers to their questions, and/or logging and updating customer information.)</i>	
Order Taking and Order Tracking	%
<i>Total FTE's = (total average hours of full-time agents + total average hours of part-time agents)/40</i>	
Technical Support to External Customers	%
<i>(Taking and tracking orders for products and/or services.)</i>	
Complaints	%
<i>(Handling customer complaints.)</i>	
Re-directing Inbound Calls	%
<i>(Routing callers to next available specialist.)</i>	
Others	%
<i>(Fill in the percentage of calls handled that are of a type other than any of the options provided above.)</i>	

Sum of percentages must Total 100 %

10. What is the total annual budget for your call center for this year?

\$

(Fill in the annual operating budget allocated for your call center for this year. The annual call center budget is the total annual dollar amount allocated for all expenses associated with the operation of the call center for which the call center manager is accountable. The annual budget should include all fully loaded direct and indirect costs for budgetary line items such as labor, benefits, and incentives for agents, management, training, and support personnel; HR costs (e.g., recruiting, screening, training); telephony expenses (toll, trunks, equipment); technology purchases/installation (hardware, and software); technology maintenance (hardware, and software) network; furniture, fixtures, decorations, etc.; utilities (gas, water, power, UPS backup); maintenance (repair, janitorial, upkeep); supplies; overhead expenses and charge-backs for shared corporate costs (e.g., legal, risk management, payroll administration, IT support, security, accounting, grounds keeping, real estate, floor space, common areas, etc.) as applicable.)

11. How do you compensate your agents?

Average hourly wage for front-line agents

\$

Average hourly starting wage for front-line agents

\$

12. What is your average cost per call in dollars?

(This is the sum of all costs for running the call center (refer to definition for annual budget in question 11) for the period, divided by the number of calls handled in the call center for the same period. This would include all calls whether handled by an agent or by the IVR.)

\$

13. Over the past 12 consecutive months, what were your average inbound performance time-based metrics?

a

- 80% of your calls are answered in how many seconds

*(This is a productivity measurement of the average time in seconds it requires for the center to answer 80% of its calls offered. This differs from standard service level measurements that set a goal in time to which the center shall attempt to handle a prescribed volume of calls within. Use the following formula to calculate this value: Let X = your service level time; let Y = your service level percentage; S = the time in which 80% of calls are answered. $S = (X * .80)/Y$. For example, if you answer 93% of your calls in 20 seconds the results are as follows: $S = (20 * .80)/.93 = 17.20$ seconds.)*

b

- Average speed of answer (ASA) in seconds

(This is the total answer time (ring time and queue time) divided by the total number of calls answered during the target period. This value is often provided by your ACD)

c

- Average talk time (ATT) in minutes (includes hold time)

(This is the sum total of agents time in talk mode divided by the total number of calls handled by agents.)

d

- Average after call work time (ACWT) in minutes

This is the sum amount of time agents spend on performing follow-up work after the agent has disconnected from the caller, divided by the total number of calls handled by agents. The data for after call work time is taken from the ACD and should be calculated by individual and group, daily, weekly, and monthly. Most ACD systems provide this number.)

e

- Average time in queue in seconds

(This is the average wait time that a caller endures waiting for an agent to answer the telephone after being placed in the queue by the ACD. This differs from average speed of answer because this calculation includes only calls that actually had a wait time. This metric is also known as average time of delay. Most ACD systems provide this number.)

- f Average caller hold time in seconds while on the phone with an agent

(The cumulative sum total of all hold time, divided by the number of calls placed on hold for the period measured. Most ACD systems provide this number.)

14. Over the past 12 consecutive months, what were your average inbound performance percentage-based metrics?

- a Average abandoned in percent %

(This is the percentage of calls that were connected to the ACD, but were disconnected by the caller before reaching an agent, or before completing a process within the IVR.)

- b Calls resolved on first call in percent %

(This is the percentage of calls that were completely resolved during the course of the first inbound call initiated by the customer, and therefore do not require a call back.)

- c Agent Occupancy in percent %

(This is the total staffed time logged in to the ACD (including ready/available, engaged on call, in ACW, in AUX, or other active states), divided by the total scheduled hours at work.)

- d Adherence to schedule in percent %

(This percentage represents how closely an agent adheres to his/her detailed work schedule as provided by the workforce management system. 100% adherence means that the agent was exactly where they were supposed to be at the time projected in their schedule. The scheduled time allows for meetings with the supervisor, education, plus answering customer phone calls, e-mails, & chats.)

- e Average attendance in percent %

(This is a percentage representing how often an agent is NOT absent from work due to an unplanned absence (not

to include excused absences, i.e., vacation, FMLA, jury duty, etc.). Take the total number of unexcused absences and divide it by the total number of days that the agent was expected to be at work, and subtract that number from 100.)

f

. Average calls transferred in percent %

(The total number of calls transferred by agents (due to their inability to properly handle the call – for whatever reason), divided by the total number of unique calls handled by agents. This would not include voluntary transfers to other departments after resolution occurs for the initial call reason.)

g

. Average Auxiliary (Aux) Time in percent %

(This is the average amount of time per shift, in percent, that an agent is logged into an Aux state. This should include all authorized off-line time, i.e. time set aside for handling e-mails, training, or other job-related tasks.)

h

. Average Utilization in percent %

(Agent utilization is a calculated metric reflecting the percentage of an agent's shift where the agent is logged into the system, engaged in active "telephone mode" which involves "talk time (ATT)", "hold time (AHT)", and "after-call-work time (ACWT)." Utilization equals the product of average call handle time (talk time + hold time + after call work time) and the average number of inbound calls per Agent per shift (ACPS), divided by total time the Agent is connected to the ACD and ready to handle calls during a shift, i.e., occupancy in minutes.)

$$\text{Utilization} = \left(\frac{(\text{ATT} + \text{ACW})(\text{ACPS})}{\text{Occupancy_in_min.}} \right) \times 100$$

15. What is the average number of calls that an agent handles per hour?

(The total number of calls handled per agent per shift divided by the total hours worked.)

16. What is the average number of shifts per year worked by your agents?

(On average, a full-time agent works approximately 250 shifts per year; however, the number of shifts worked by part-time agents may actually be more or less than this depending upon the average length of shifts and numbers of shifts worked per day. This may also be interpreted as the average number of times that an agent reports to

work.)

Full-Time agents _____

Part-Time agents _____

17. What is the average shift length in minutes of your agents?

(Please provide scheduled work-time minutes only. Do not include lunch. For example 480 minutes – 30 minutes for lunch = 450 work-time minutes.)

Full-Time agents _____

Part-Time agents _____

18. Does your call center have a formal process to collect the caller's satisfaction regarding their experience with how their call was handled?

Yes _____

No _____

(By formal process, we mean an established routine process of gathering customer feedback regarding their recent calling experience, such as after-call IVR surveys, follow-up outbound (live agent) calls, follow-up e-mail surveys, etc.)

19. On average, in the past 90 days what percentage of your callers gave you a perfect score on the question, "Overall, how satisfied were you with the service you received during your call to our center?"

(A "highest" score of 5 out of 5, or the top of whatever scale you use.)

%

20. On average, in the past 90 days, what percentage of your callers gave you the lowest score on the question, "Overall, how satisfied were you with the service you received during your call to our company?"

(A "lowest" score of 1 out of 5, or the top of whatever scale you use.)

%

21. Does your call center have a formal mechanism for gathering agent feedback?

Yes _____

No _____

(By formal process, we mean an established routine process of gathering customer feedback regarding their recent

calling experience, such as after-call IVR surveys, follow-up
outbound (live agent) calls, follow-up e-mail surveys, etc.)

22. On average, in the past 90 days, what percentage of your agents gave you a perfect score on the question, "Overall, how satisfied are you with your position?"

(A "highest" score of 5 out of 5, or the top of whatever
scale you use.)

%

23. On average, in the past 90 days, what percentage of your agents gave you the lowest score on the question, "Overall, how satisfied are you with your position?"

(A "lowest" score of 1 out of 5, or the top of whatever scale
you use.)

%

24. What is the ratio of agents to supervisors (span of control)?

Agents per supervisor

#

(Total agent headcount divided by total number of
supervisors, rounded to nearest whole value.)

25. What is the annual percentage turnover of your full-time agents?

(Please refer to Appendix B for guidelines and the formula
to calculate the annual percentage of turnover of your full-
time agents.)

%

26. How does your total annual full-time agent turnover (Question 26 above), how does this break down into the following two categories (by percentage)?

Promotional turnover

%

(This is the turnover caused by promotions within the call
center from "agent" to some other position in the call
center, and/or promotions where agents go to other
departments within the company.)

All Other Turnover

%

(This is all other turnover not related to promotions,
but related to and including voluntary and
involuntary termination.)

Sum of percentages must Total 100 %

Contact Center Performance – Alternate Contact Channels

27. For your inbound Email contact channel, what is your current average for the following Key Performance Indicators?

Description Of Answer	Average
Average annual volume of Emails handled	
Average response time IN HOURS (use decimal if necessary)	
Average overall processing time, IN MINUTES (use decimal if necessary)	
Average First-Contact Resolution Rate in percent	%
Up-sell/Cross-sell Close Rate for Emails in percent	%
Average cost per Email in \$US (use US dollars & cents)	

28. For your Web Chat contact channel, what is your current average for the following Key Performance Indicators?

Description Of Answer	Average
Average annual volume of Web Chats handled	
Average speed of answer IN SECONDS (use decimal if necessary)	
Average chat session time IN MINUTES (use decimal if necessary)	
Average First-Contact Resolution Rate in percent	%
Up-sell/Cross-sell Close Rate for Web Chats in percent	%
Average cost per Web Chat in \$US (use US dollars & cents)	

Installed Technology

Software / Hardware Type	Definition	Have? (Y/N)	Vendor	Model / Version / Release
PBX	Public Business (or Branch) eXchange: a telephone switching device owned by a private company vs. one owned by a common carrier.			
ACD	Automatic Call Distributor: a device used to manage and distribute incoming calls to a specific group of terminals (agents).			
DTMF (Touch-tone) IVR	IVR provides self-service options to callers via menu choices selected with keys on a touch-tone telephone system.			
ANI / DNIS for Customer ID	Technology that identifies the caller's identity using automatic number identification (ANI) or direct number identification system (DNIS).			
Natural Language IVR	Enhanced IVR that provides service options to callers via spoken menu choices and is coupled with speech recognition technology to recognize spoken responses from the caller.			
Speech Recognition	Technology designed to use interpreted human speech that enables people to interact with a natural language IVR.			
Personalized VRU	A VRU that delivers a personalized message based upon the identity of the caller.			
E-mail Management System	Provides tracking and routing of email.			
E-mail Response System	Technology that offers customers & prospects an alternate contact channel for communicating with a customer service contact center.			
Web Contact Chat	Technology that enables customers & prospects the ability to directly communicate with a live agent by keyboard via a chat link from the website.			

Software / Hardware Type	Definition	Have? (Y/N)	Vendor	Model / Version / Release
Separate Toll-Free Numbers	A set of toll-free trunks which allow callers to directly call into a specific department; also used for high-value customers.			
Skills Based Routing	Technology enabling the routing of calls to agents assigned a particular skill or set of skills. A common component of most ACD systems			
Value Based Routing	A programmable form of Skills Based Routing targeted at Customer Value where customers are ranked in value and their calls are directed to designated agents.			
Pre-Routing to ACDs	The ability to route a customer to a specific agent with specialized skills (i.e. English, Spanish, etc.) by having the customer pressing a numeric option.			
Routing across ACDs	An advanced routing technology that routes calls to the next-available-agent through networked call centers.			
Blended Routing	The ability to route all channels of inquiries (email, chat, phone) to a blended agent. This helps an agent to be fully utilized and efficient with their time.			
Routing beyond Call Center	The ability to route the customer to another service. This is another revenue channel for the company. (i.e. Southwest Airlines routing the callers to Hertz for rental calls)			
Unified Cross-Channel Routing	The ability to escalate inquiries to another channel of communication (i.e. from chat to co-browse, phone call, etc.)			
Competency Based Routing	The ability to route a call to an agent with that is the most competent in handling the call by looking at the attributes of an agent. (i.e. caller calling for Spanish and the all the agents that are primary Spanish speakers are occupied. The call will get routed to the next agent that speaks Spanish as her secondary language versus her first.			
Multi-Criteria Routing	The ability to route based on multi criteria. (i.e. call calling for cable, internet, and phone service. This call is routed to an agent that can serve all three.)			

Software / Hardware Type	Definition	Have? (Y/N)	Vendor	Model / Version / Release
No Queue, Hunt Group	This is the ability to ring all phones at the same time.			
ACD Based Queue	A call queuing system that is included as a component of the ACD.			
Music on Hold	Technology that plays music to callers in the hold queue.			
Recorded Message while on Hold	Technology that plays recorded messages to callers in the hold queue.			
Announced Wait Time in Queue	Technology that intermittently announces the estimated wait time to callers in the hold queue.			
Virtualized Enterprise Queue	The ability to queue the calls at a centralized location until the next available agent (at any site) can take the call.			
Courtesy Call-Back while in Queue	Technology that presents the option to callers in the hold queue to hang up without losing their place in queue, and be called back when their call reaches the top of the queue, rather than waiting on hold.			
Queue Prioritization	Technology that prioritizes the queuing of callers based upon the caller's identity, moving high-value callers toward the front of the queue.			
Customer Cross-Sell Message while in Queue	Technology that plays recorded sales messages for other company products while callers are waiting in the hold queue.			
Universal Multi-Channel Queue	The ability to integrate all contact channels into one queue so that the agent is fully utilized.			

Software / Hardware Type	Definition	Have? (Y/N)	Vendor	Model / Version / Release
Agent Desktop with CTI	Computer Telephony Integration: the technology that enables the coordination and integration of computer and telephone systems. Functions of CTI include: Calling Line Information Display, Screen Population (on call answer), On Screen Dial, Preview and Predictive Dial, & On Screen Call Control			
Speech Synthesis Apps	The ability for the IVR to provide self-service to the customer before they get routed to an agent to resolve the issue (i.e. checking savings balance)			
CTI & Apps Integration	The ability to use the CTI to automatically update data in other applications.			
Agent Pop-Ups for Up-sell / Cross-sell	Technology that automatically pops-up sales scripts on the agents' monitors.			
CRM Desktop System	Customer Relationship Management systems track customer information and interactions with the company			
Automated Personal Call-Backs	The ability to call back a customer that selected the call-back option while they were in queue.			
Presence- Based Expert Escalation	The ability to use an IM client to connect the customer to an expert instantly.			
Silent Call Monitoring	Technology that enables call center supervisors and quality monitors to capture, monitor, record, and evaluate most customer/agent interactions			
Agent Trace	Basic technology that permits tracing of any agent actions while logged into the ACD.			
Call Recording & Retrieval	Technology that enables call center supervisors and quality monitors to capture, monitor, record, and evaluate customer/agent calls without the agents' or the callers' knowledge.			

Software / Hardware Type	Definition	Have? (Y/N)	Vendor	Model / Version / Release
Contact Data Analytics	Report management system			
Cradle to Grave Reporting	Grave reporting provides the exact chronology of each call on your system from the moment the call hit your phone switch to the instant the call ended.			
Advanced Reporting & Analytics	The ability to have data that show trends (AHT, FCR, etc.) and also enables advanced statistical analysis (correlation, cross-tab, regression, etc.).			
Automated Customer Survey (IVR)	A system that gathers and analyzes caller satisfaction immediately following the call via the IVR.			
E-mail Satisfaction System	A system that gathers and analyzes e-mail customer satisfaction to better understand and serve customers			
Real-time Agent Feedback Tools	The ability to consult an agent during a call via a “whisper” or chat window on the agent desktop.			
Actionable Alerts with Solutions	The ability to keep the center’s performance level at par through an alert that shows an agent or KPI is out of compliance, enabling management to undertake appropriate action to restore performance to an acceptable level.			
Workforce Management	Technology often used for call forecasting and agent scheduling through historical call data. Other functions of workforce management may include skills-based scheduling, schedule adherence, time-off administrations, performance management tools and reporting.			

APPENDIX E - ABOUT BENCHMARKPORTAL

BenchmarkPortal is the leader in Call Center Benchmarking, Call Center Training and Call Center Consulting. Since its beginnings in 1995 under Dr. Jon Anton of Purdue University, BenchmarkPortal has grown with the contact center industry and now hosts the world's largest call center metrics database in conjunction with the Center for Customer Driven Quality.

Led by CEO Bruce Belfiore, the BenchmarkPortal team of professionals has gained international recognition for its call center expertise and innovative approaches to Best Practices for the call center industry. BenchmarkPortal's activities include The College of Call Center Excellence, a leader in call center training and certification, and *CallTalk*, the first on-line talk show specifically focused on the call center industry.

BenchmarkPortal's stated mission is to help customer contact managers in all sectors to optimize their centers in terms of efficiency and effectiveness.

Website: www.BenchmarkPortal.com

APPENDIX F - ABOUT CISCO

About Cisco

Cisco (NASDAQ: CSCO) is the worldwide leader in networking that transforms how people connect, communicate and collaborate. Information about Cisco can be found at www.cisco.com. For ongoing news, please go to newsroom.cisco.com.

About Cisco Collaboration

From award-winning IP communications to mobility, customer care, Web conferencing, messaging, enterprise social software, and interoperable telepresence experiences, Cisco brings together network-based, integrated collaboration solutions based on open standards. These solutions offered across on-premises, cloud-based or virtualized platforms, as well as services from Cisco and our partners, are designed to help promote business growth, innovation and productivity. They are also designed to help accelerate team performance, protect investments, and simplify the process of finding the right people and information. Information about Cisco Collaboration can be found at www.cisco.com/go/collaboration

Footnotes

ⁱ ***Integrating People with Process and Technology*** by Dr. Jon Anton, Dr. Natalie L. Petouhoff and Lisa M. Schwartz, Anton Press, 2004.

See also ***Benchmarking At Its Best for Contact Centers*** by Bruce Belfiore with Dr. Jon Anton, Anton Press, 2004