Focused Sampling Orientation: Strategy for Quality Assurance in Company XYZ

Jhamela Mae G. Gutierrez and Jenalyn Shigella G. Yandug
School of Industrial Engineering and Engineering Management
Mapua University
658 Muralla St, Intramuros, Manila
jmggutierrez@mymail.mapua.edu.ph, jsgyandug@mapua.edu.ph

Abstract

The business process outsourcing (BPO) industry continuously grows in the Philippines for its low cost and strategic location. The industry practices quality assurance, which involves defining and implementing processes to produce deliverables that are defect-free and of high quality. Company XYZ uses random sampling for its sample selection. However, this resulted in a gap between their Quality Assurance (QA) and Customer Satisfaction (CSAT) scores. The purpose of the study is to look for a specific sampling technique to reduce the gap between the CSAT Score and QA Score of Company XYZ and to accurately detect and locate where a high percentage of defects are found and encountered. Using the focused sampling technique, two report drivers were identified as 1. Handling time also refers to efficiency, and 2. customer contacts show the number of times a customer contacted the business. Based on the result of the Paired T-test, the focused sampling has a significant difference from the random sampling technique. The focused sampling technique bridged the gap between Company XYZ's QA score and CSAT score as the QA score decreased for each team simultaneously as the rate of defects increased. The top opportunity identified for focused sampling explains why customers are dissatisfied with the service. Future studies may integrate other drivers that are critical to their business and customer.

Keywords
Quality Assurance, Sampling Technique, Focused Sampling, Random Sampling

1. Introduction
The Philippines' business process outsourcing (BPO) industry has been growing steadily in the past years, making it one of the most successful and fastest-growing sectors (Padilla, 2020). Business Process Outsourcing uses technology or specialist process vendors to provide and manage an organization's critical to non-critical processes and applications (Philippine Statistics Authority, 2012). The industry now has more than 1 million direct employees. It is also considered the 39th largest economy in the world. The BPO industry in the Philippines has projected to produce 1.3M new jobs and is expected to surpass the OFW remittances. The growth in this industry is seen in Manila and other city provinces (Padilla, 2020). Call or contact centers are one of the significant components of the Philippine BPO industry. Contact centers refer to a group with a joint function or a facility that provides a place for a specific activity or serves as a go-to-between, messenger, connection, or source of information (Abbott, 2004).

Quality is essential in all industries as it is the attitude that flows throughout the organization. Quality means more than simply meeting the customer's expectations. It means meeting or exceeding the customer's implied or perceived expectations to provide value (Abbott, 2004) as the quality of service affects customers' satisfaction (Abdul & Purwatmini, 2018). The BPO industry practices quality assurance as well. It monitors transactions, evaluates their quality to provide feedback to employees and process owners, spots opportunities for process improvement, and ensures the integrity in handling data supplied by the customer follows per compliance (Sharma & Chetiya, 2014).

Call center businesses in the Philippines practice quality assurance by conducting call barging, simply listening to several agents' calls chosen at random. These calls will then be audited and rated based on the standard checklist of service criteria. Agents will be graded based on whether they are courteous, polite, and grammatically correct in conversations with callers. Their performance will be recorded and discussed in periodic, formal evaluations (Magellan Solutions, 2018). Usually, evaluators will catch some defects from the sample, but 99 percent of the time, the sample is clean and does not offer any insight to improve the service center operations (Lafosse, 2019). Traditional

companies such as GENEX Infosys Limited, an Indonesia-based BPO company, randomly select their samples for Quality Assurance but at the same time also practices judgment selection by filtering call durations. Auditors will then evaluate the agent based on the format prescribed by the company (Ahmed, 2016). Another company, Safe Auto Call center, a Canada-based contact center that relies on a human to review incidents, also practice probability sampling by randomly selecting calls or incidents, listening to them, and providing a score based on agent performance. The current practice proved costly and is limited in scope (McMurtry,2020).

Company XYZ, a Manila-based contact center supporting an international Casino, uses a probability sampling method to draw their samples for Quality Assurance (QA). As seen in Figure 1, a weekly pool of incidents is extracted from the system and manually added to their randomizer file. Incident refers to a report handled by an Agent. Quality Coaches will randomly pick an incident from the file to audit the handling quality based on their process, and the score is based on the matrix. Audit refers to the process of checking the incident in conformance to the company procedure.

Figure 1. Sampling Selection Process of Company XYZ

Table 1 below shows the Score Rating that Company XYZ follows. For the first quarter of 2021, Company XYZ's running QA Score across all teams is 3.94. Using three as a baseline to emphasize the scores, as seen in Figure 2, the result for all groups is leaning towards the successful score. This could mean that they are efficient and effective in their job on the Operations side. Still, on the Quality Assurance side, this could mean that they cannot identify opportunities within the system.

Table 1. Quality Scoring Matrix of Company XYZ

| Score	Rating	Definition
1	Auto Fail	*Major Defect* - Actions done or missed are on the list of Zero Tolerance
2	Below Expectation	*Medium Defect* - Actions done or missed that impacted the customer or business but is not listed on Zero Tolerance
3	Needs Improvement	*Minor Defect* - Non-impacting actions done or missed. Usually a simple step in the process.
4	Meets Expectation	*No Defect* - Necessary actions on the account are in line with the process.
5	Above and Beyond	An extra mile action is done on the account that resulted in a better resolution of the incident.
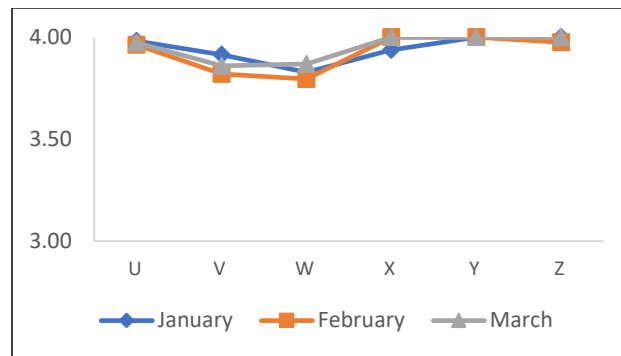
Figure 2. Team Average Scores for Q1 of 2021

According to Thompson and Ramsey (1995), the sampling method in Quality Assurance plays a vital role in spotting opportunities for improvement. The quality of a result can be no better than that of the sample analyzed. This shows why the scores are relatively high, as the Quality Assurance Team rarely finds opportunities for most teams using the current sampling technique.

On the other hand, the Customer Satisfaction (CSAT) score for the first quarter has an average score for Ease, Satisfaction, and Resolution at 70.60%, 69.60%, and 64.01%, respectively, where the passing score is 80%. CSAT refers to customers' perception of service quality from the interaction with the contact center. It is measured in a post-service survey sent after a resolved ticket (Yeager, 2020). Maestro, a Quality Assurance provider to companies such as Etsy, Classpass, Tinder, and Zoom, proved that teams who build out QA programs - and pay attention to what's at the root of their QA scores - often end up increasing CSAT in the process (MaestroQA, 2018). Based on the data, Company XYZ's quality score does not reflect their customers' satisfaction score, which according to (Reed et al., 2000), quality should generate customer satisfaction. Another pain point of the current sampling technique is detecting low opportunities for most teams across all sites (see table 2).

Table 2. Breakdown of Defects for Q1 2021 of Company XYZ

TEAMS	Auto Fail (Major Defect)	Below Expectation (Medium Defect)	Needs Improvement (Minor Defect)	Meets Expectation (No Defects)
U	2	0	5	423
V	9	3	11	290
W	16	82	96	2064
X	2	0	1	263
Y	0	0	0	129
Z	0	0	1	215

Moreover, Company XYZ's Quality Assurance provider has said that the probability sampling technique used by the company does not promote strategic selection of incidents based on importance and criticality to the business. Moreover, random sampling does not usually cover high-value prospects, repeat contact due to non-resolution, efficiency in incident handling time, and others (Sentient Solutions, 2020). Table 2 shows that most teams of Company XYZ met all expectations for almost all samples for Q1 of 2021. But the QA spotted most opportunities for Teams U and W. This indicates that the current sampling technique may only be effective to Teams U and W.

Thus, the researchers aim to look for a specific sampling technique to reduce the gap between the CSAT Score and QA Score of Company XYZ and accurately detect and locate where a high percentage of defects are found and encountered. Specifically, this study aims to analyze the current sampling technique used by Company XYZ to

determine its limitations. This paper also intends to propose a new sampling strategy that will allow Company XYZ to accurately detect and locate where a high percentage of defects are found and encountered. Finally, this paper also aims to evaluate and identify the significant effect of the proposed method on the overall QA Score.

2. Methodology

To identify which Sampling Technique best fit Company XYZ's needs, the researchers first conducted a SWOT analysis to assess the current sampling tool's strengths, weaknesses, opportunities, and threats which were the basis for the alternative strategies generated from the TOWS Matrix. After which, the authors employed decision analysis to select the new sampling technique. The researchers focused on integrating the Purposive Sampling Technique in the incident selection of Company XYZ to determine if it can bridge the gap between QA Score and CSAT Score. The study also tested if the proposed sampling technique will increase the defects rate. The study was guided by the conceptual framework as shown below:
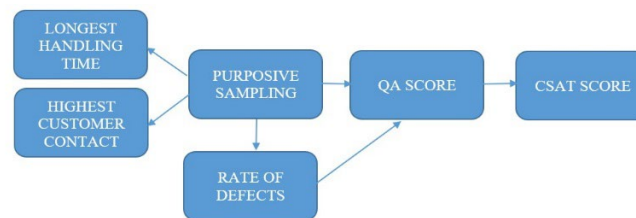

Figure 3. Conceptual Framework

To integrate the Judgement Sampling Technique, two categories were used to select the sample from the pool of incidents, namely as follows: 1. Highest Handling Time and 2. Highest Customer Contact as these categories highly impact customer experience (CallMiner, 2019). To determine whether there is statistical evidence that the mean difference between the old scores and the new score of the teams is significantly different from zero, a Paired T-test was utilized. And to test the effect of the method on detecting defects, the researchers treated the score of 1 as a Major defect, two as a Medium defect, and three as a Minor defect. The authors adopted Six Sigma's concept of computing for Defects Per Unit (DPU), which refers to the incidents handled by agents.

$$DPU = \frac{\text{number of defects observed}}{\text{number of units inspected}} \qquad (1)$$

The computation was applied to both the old and proposed methods for all teams to compare the result and determine which is more effective in detecting defects. The result of the analysis was used to develop a detailed focused sampling strategy for Company XYZ for continuous improvement of their Quality Assurance.

3. Results and Discussions

3.1. Limitations of Random Sampling Technique

Using Swot Analysis, the researchers found some limitations on the random sampling technique as integrated into the quality assurance process of Company XYZ, as follows:

 1. There is an equal chance to spot a report with and without opportunities from the pool of incidents which means that there is no assurance that opportunities from customer dissatisfaction are also being diagnosed in the quality assurance process. Their selection is only based on tasks assigned to agents.
2. The sampling technique does not promote value to the business and the customers. Random sampling is not a strategic technique for Company XYZ, especially since the industry cannot do a 100% quality check.

To identify possible strategies that will bridge the gap between QA Score and CSAT Score for Company XYZ, the researchers utilized TOWS Matrix, shown in figure 4.
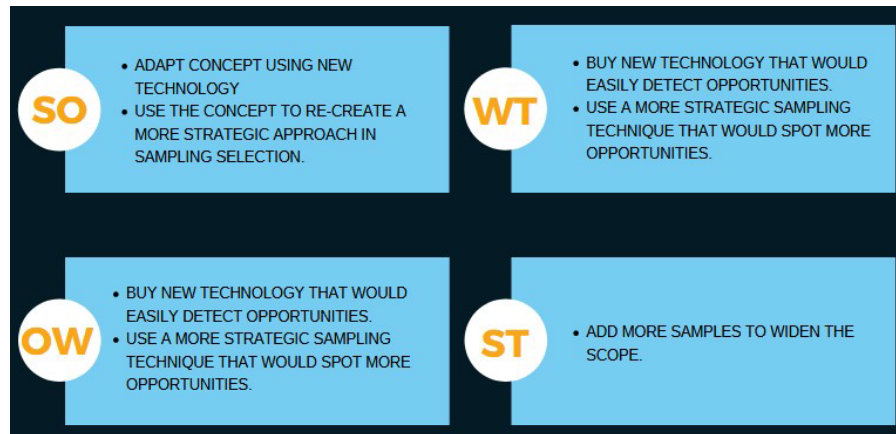
Figure 4. TOWS Analysis on Random Sampling Technique

The result of the TOWS Analysis showed three major alternative strategies for Company XYZ, namely as follows:

Alternative 1. Integrate new technology that would easily spot opportunities across all teams.
Alternative 2. Add more samples to widen the scope for quality assurance.
Alternative 3. Use a more strategic sampling technique that would be able to spot the opportunities that dissatisfy the customers.

3.2 Selection of the New Sampling Technique

Based on the result of the decision analysis, Alternative 3 is the best choice for Company XYZ. Improving their sampling selection process will help the company improve on identifying opportunities within their operations without additional cost. Furthermore, a criteria analysis was utilized where the scoring is based on the definition and steps to implement the method from the Pros and cons of different sampling techniques. (International Journal of Applied Research, 3(7), 749-752).

Table 3. Weighted Decision Matrix

Category	Weight	Cluster Sampling		Systematic Sampling		Stratified Random Sampling		Convenience Sampling		Purposive Sampling		Quota Sampling	
		Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted
Ease of use	0.2	3	0.6	3	0.6	3	0.6	5	1	5	1	3	0.6
Strategic	0.4	1	0.4	1	0.4	1	0.4	1	0.4	5	2	1	0.4
Focused	0.3	1	0.3	1	0.3	1	0.3	1	0.3	5	1.5	3	0.9
Non-Bias	0.1	5	0.5	5	0.5	5	0.5	1	0.1	1	0.1	1	0.1
TOTAL	1	10	1.8	2	1.8	10	3	8	1.8	4	4.6	8	5

Based on the result shown in Table 3, a non-probability technique, Purposive Sampling, is the best-suited technique for Company XYZ. Samples are selected deliberately by the researchers instead of random selection techniques. The researchers decide or apply judgment in determining the samples concerning the goal and purpose (Singh 2015). The purposive Sampling technique allows the Quality Assurance team to rely on their decision on what samples should be included in their quality monitoring (Sharma 2017). A decision tree analysis was further used to decide which sampling technique may be applied as a strategy for Company XYZ.
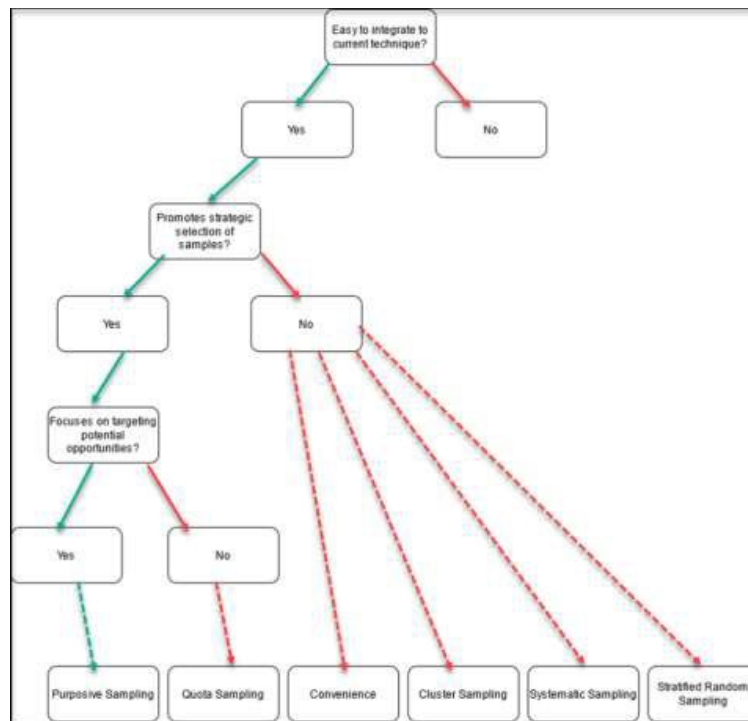
Figure 5. Decision Tree for Sampling Techniques

As shown in Figure 5, results proved that all random sampling techniques and convenience sampling do not promote the selection of samples based on importance and criticality to the business. Although a non-probability technique, convenience sampling enables selection by whichever is easily accessible to the researchers (Etikan, 2016). While purposive sampling and quota sampling are almost tied. However, quota sampling promotes randomized selection after creating subgroups that may still result in the same limitation as the current sampling technique. Quota sampling focuses on meeting the number of samples rather than the type of sample to be collected (Acharya et al., 2013). On the other hand, purposive sampling allows the quality coach to decide or apply judgment on selecting samples (Sharma 2017).

3.3 Integrating Focused Sampling Technique

A tool named Self-Adapting Focused Review System (SAFRS) was also introduced with the idea of an adaptive approach to record selection that is based upon model-weighted probability sampling. The tool promotes the focused group sampling as it allows the reviews to be concentrated on cases currently thought most likely to be problematic. The approach strikes a balance between the efficiency of correctly targeting challenging subgroups for study and the desirable inferential characteristics of simple random sampling. (Ash et al., 1990). Adapting the Focused or Judgement Sampling Technique concept, the researchers integrated two drivers following the SAFRS study. The two drivers were identified as 1. Customer Contact refers to incidents with repetitive contact, which highly contributes to the business' DSAT. 2. Handling Time refers to efficiency or spending time effectively and resolving the concern with minimum effort.

Based on Figure 6, Company XYZ's focused sampling technique strategy has the same Steps 1 and 2 as the random sampling technique. However, steps 3 to 4 showed the focus is on the samples where a judgment of the quality assurance team is being practiced by filtering the samples using the review time/number of chats column. This way, they selected the samples by making sure that those with possible problematic cases would be tested or audited.

Figure 6. Focused Sampling Selection Procedure

Using the Focused Sampling Technique or Judgement Sampling method, the researchers arranged the incidents based on the highest to lowest handling time or highest to the lowest occurrence of customer contact. Once arranged, the researchers selected the incident with the highest value and forwarded it to the Company XYZ's Quality Coach for audit.

Table 4. Sample Report for Customer Contact Driver

Account Number	UserName	Last Name	Managed Acct?	Registered on	Country	Total Chats
Account A	MoneyMe_01	Manzano	No	6/14/2014 20:50	Osterreich	11
Account B	Citi_Life	Mcguire	No	8/20/2019 15:00	Netherlands	10
Account C	Rai12345	Lyz	No	9/28/2002 17:20	United Kingdom	8

As seen in Table 4, the report for Customer Contact Driver includes a column that indicates Total Chats, which refers to the number of times the customer contacted through chat. Using this indicator or driver, quality coaches prioritize customers who have reached the business several times. Thus, it may reflect the non-resolution of their cases, which is a critical customer subject.

Table 5. Sample Report for Handling Time Driver

account	review	reviewer	reviewTime	Rule Name	Date
Account A	risk	Agent1	1539	Rule11	6/12/2021
Account B	no-risk	Agent2	1535	Rule20	6/12/2021
Account C	risk	Agent1	1515	Rule05	6/12/2021

Table 5 shows a sample report for Handling Time Driver or efficiency. This includes a column with review time, which refers to the time used by the reviewer to handle the account or incident from start to end. The accepted handling time may vary depending on the review and the rule name. Quality Coaches referred to their process for auditing.
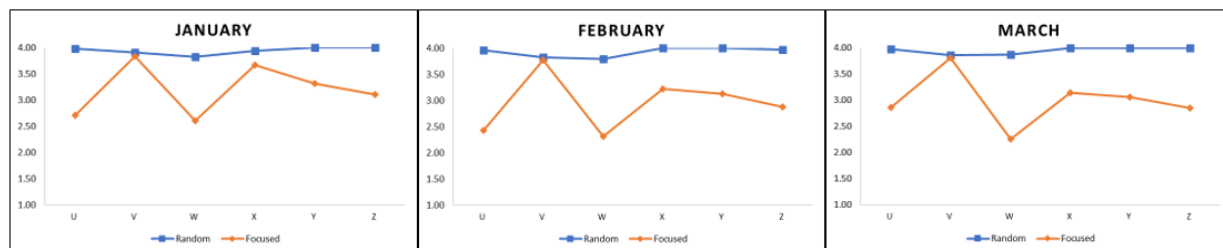

Figure 7. Random Sampling Scores vs. Focused Sampling Scores for Q1 2021

Figure 7 shows that lower performance was identified using the focused sampling technique as the teams' scores are placed lower than the line from random sampling.
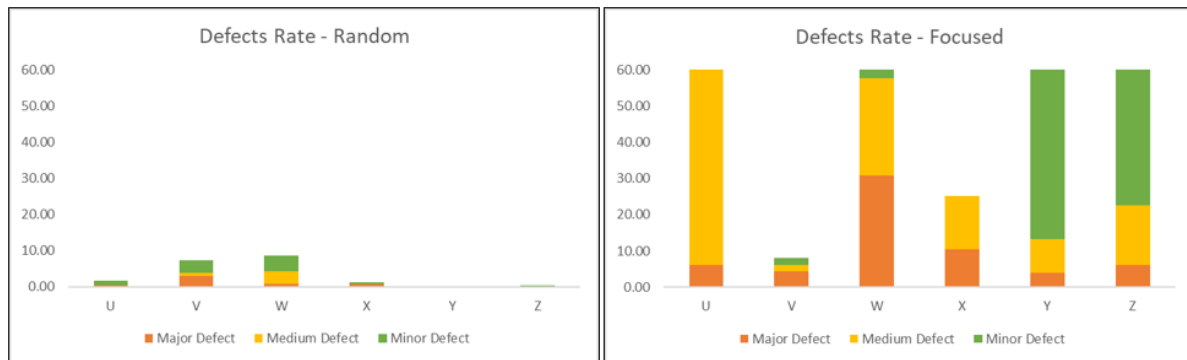
Figure 8. Defect Rate (Random Sampling vs. Focused Sampling)

Figure 8 shows that each team's opportunities identified using the focused sampling technique increased. The variation of defects is also evident from the results of the focused sampling technique. Figure 8 also showed that the focused sampling technique spotted more zero-tolerance incidents than the random sampling technique.

Table 6. Opportunities from Random Sampling

Opportunities	Incidents
Correspondences & notes on all sections	331
Completeness and Fairness	312
Application / Removal of restrictions	233
Documents	157
Customer details / General player information	127
Registered Deposit methods/transactions	119
Flags / Alerts	92
Iovation	62
Forwarding to the relevant department	50
Customer Attributes	48
Tone of voice, language used and structure	45
Risk Profile	39
Gameplay activity / bonuses received	37
Resolution of task within an acceptable timeframe	31
FS rules	22
Withdrawal methods/transactions	22
Management Approvals	1
Grand Total	1728
Total Samples	12250

Table 7. Opportunities from Focused Sampling

Opportunities	Incidents
Delayed resolution	954
Inability to use sources	486
Coordination across teams	345

Incorrect/Incomplete notation	229
Incorrect/ Incomplete information relayed to the customer	194
Inability to apply/remove restrictions	160
Failure to apply proper risk profiling	147
Incorrect tagging	128
Inaccurate validation of documents	106
Incorrect handling of WD	71
Confusing process	48
Poor understanding of the issue	40
Compliance	28
Poor language, tone, and structure	15
Inability to update customer's details	15
Grand Total	2966
Total Samples	7067

As seen in Tables 6 and 7, the opportunities identified per method have similarities and differences. For the Focused Method, the researchers found that delayed resolution is the top opportunity for Company XYZ. Delayed resolution reflects how customers are dissatisfied with resolving their incidents and explain multiple contacts within the business. While for the random method, we can see that the top opportunity has something to do with adding notes on the account or incident. The delayed resolution would fall under the zero-tolerance category when comparing the two top opportunities. The incomplete notes are more of a hit-or-miss action, which usually scores at three because it is not highly impactful to the customer and the business.

For the Focused Method, we can also see those new opportunities such as "coordination across teams" were identified as an opportunity which means that conflicts impacted delayed resolutions and high handling time in coordination with other teams. Based on Tables 6 and 7, the top opportunity found in random sampling is the slightest opportunity found on the focused selection.

Table 8. Result of Paired T-test

Month	Mean		Standard Deviation		Standard Error Mean		P-Value
	Random	Focused	Random	Focused	Random	Focused	
January	3.943	3.21	0.066	0.496	0.027	0.202	0.014
February	3.927	2.958	0.092	0.538	0.037	0.22	0.007
March	3.95	2.998	0.067	0.503	0.027	0.205	0.006

Table 8 shows that the current sampling method produced a mean average score of 3.9 for the first quarter of 2021, while the proposed sampling method using the focused orientation has a mean average score of 3. This means that most teams showed more unsatisfactory performance using the focused sampling technique because more opportunities were identified, as seen in Figure 8. The P-values are all less than the significance level of 0.05; thus, the two methods have a significant difference. Table 8 also shows that the data from the focused method is spread out compared to the data from the random sampling as the standard deviation values are higher than that of the random sampling technique.

4. Conclusion

According to (Desiyanti et al., 2018), service quality positively and significantly affects customer satisfaction. This means that service quality directly impacts customer satisfaction. (Supriyanto et al., 2021) In the case of Company XYZ, the researchers found a gap between the QA Score and CSAT Score. According to Quality Assurance Team,

the site is performing well, and the scores are almost perfect. However, customers scored the area at 68%, which showed their dissatisfaction with the service.

The researchers found that the integration of the focused sampling technique to the current sampling selection of Company XYZ is the best alternative for the business as this does not require an additional cost and additional staffing. Based on the result of the study, there is a significant difference in the scores between random sampling and focused sampling techniques. These differences are further supported by the defects rate and defects variation found on each team. The defects rate is higher for each team using the focused sampling technique than that of random sampling. The final QA Score from focused sampling is three, which can now be associated with the CSAT score of 68%, given the variations of defects detected across all teams. The focused sampling technique bridges the gap between the QA and CSAT scores and addresses the limitations of the random sampling technique. Based on the result of the opportunities spotted per method, new activities were identified that were thoroughly impactful to the customer and business. The delayed resolution topped as the most opportunity identified in focused sampling. This shows that the customers' dissatisfaction is related to the delays in the key of their queries. The result was driven by the high handling time of the agents and the multiple contacts received by the business.

The use of the focused sampling orientation as a strategy for quality assurance for Company XYZ is effective under the two report drivers, namely 1. Handling time can also be known as efficiency and, 2. Customer Contact which referred to the number of times a customer contacted the business. These drivers were selected because first call resolution highly affects the customer experience. (Aksin et al., 2009)

Future studies may integrate other drivers or focuses that are critical to their business and customer. They may include productivity drivers, which refer to the team's highest number of case types. This driver may also be related to multiple customer contacts, critical to business.

References

Abbott, J. C.. *The Executive Guide to Call Center Metrics*. Google Books. https://books.google.com.ph/books?id=xztzyXulwoMC&printsec=frontcover#v=onepage& q&f=false. (2004)

Abdul, F. W., & Purwatmini, N. Improving service quality of call center using dmaic method and Service Blueprint. *Journal of Management and Business*, *15*(1). https://doi.org/10.24123/jmb.v15i1.38 (2018)

Acharya, A. S., Prakash, A., Saxena, P., & Nigam, A. Sampling: Why and how of it? *Indian Journal of Medical Specialities*, *4*(2). https://doi.org/10.7713/ijms.2013.0032 (2013)

Ahmed, Z. (rep.). *Ensuring Quality service in an outsourced call center company (GENEX Infosys Limited)*. 66 Mohakhali, Dhaka 1212. (2016)

Aksin, Z., Armony, M., & Mehrotra, V. The modern call CENTER: A Multi-disciplinary perspective on operations management research. *Production and Operations Management*, *16*(6), 665–688. https://doi.org/10.1111/j.1937-5956.2007.tb00288.x (2009)

Ash, A., Shwartz, M., Payne, S. M., & Restuccia, J. D. The Self-Adapting Focused Review System. Medical Care, 28(11), 1025–1040. https://doi.org/10.1097/00005650-199011000-00005 (1990).

CallMiner. *How to Improve Your Call Center Monitoring Practices*. CallMiner. https://callminer.com/blog/improve-call-center-monitoring/ (2019)

Desiyanti, N. L., Sudja, I. N., & Budi Martini, L. K. Effect of Service Quality on Customer Satisfaction, Customer Delight and Customer Loyalty (Study on LPD Desa Adat Sembung and LPD Desa Adat Seseh). *International Journal of Contemporary Research and Review*, *9*(03), 20660–20668. https://doi.org/10.15520/ijcrr/2018/9/03/483 (2018)

Etikan, I. Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1. https://doi.org/10.11648/j.ajtas.20160501.11 (2016)

Lafosse, M.*Why Random Sampling Alone is Not Enough to Ensure Contact Center Quality*. Calabrio. https://www.calabrio.com/wfo/quality-management/whyrandom-sampling-alone-is-not-enough-to-ensure-quality/. 2019

MaestroQA. *CSAT Scores VS Quality Assurance Scores – Which Is Better?* MaestroQA. https://www.maestroqa.com/blog/customer-satisfaction-vs-quality-assurancemetrics. 2018

Magellan Solutions. *Everything You Need to Know About the Philippine Call Center Industry*. Philippines Call Center. https://www.magellan-solutions.com/blog/thephilippine-call-center-industry/. 2018

Mariappan, R., Peddamuthu, B., Raajaratnam, P. R., Dandapat, S., Pande, N., & Roy, S. QART. *Proceedings of the 25th ACM International on Conference on Information and Knowledge Management.* https://doi.org/10.1145/2983323.2983342 2016.

McMurtry, W. (2020). Information Retrieval for Call Center Quality Assurance. (*Electronic Thesis or Dissertation*). https://etd.ohiolink.edu/ 2020

Miciak, A., & Desmarais, M. Benchmarking service quality performance at business-tobusiness and business-to-consumer call centers. *Journal of Business & Industrial Marketing*, *16*(5), 340–353. https://doi.org/10.1108/08858620110400205 2001

Padilla, C. *The Rise Of BPO Industries In The Philippines*. Business Diary Philippines. https://businessdiary.com.ph/13306/the-rise-of-bpo-industries-in-thephilippines/. 2020

Paprzycki, M., Abraham, A., Guo, R., & Mukkamala, S. Data Mining Approach for Analyzing Call Center Performance. *Innovations in Applied Artificial Intelligence*, 1092– 1101. https://doi.org/10.1007/978-3-540-24677-0_112 2004

Philippines Statistics Authority. 2010 ASPBI - Business Process Outsourcing (BPO) Activities: Preliminary Results. https://psa.gov.ph/content/2010-aspbibusiness-process-outsourcing-bpo-activities-preliminary-results. 2012

Reed, R., Lemak, D. J., & Mero, N. P. Total quality management and sustainable competitive advantage. *Journal of Quality Management*, *5*(1), 5–26. https://doi.org/10.1016/s1084-8568(00)00010-9 2000

Reh, F. J. *Tips for Implementing Quality Monitoring Processes in Call Centers*. The Balance Careers. https://www.thebalancecareers.com/quality-monitoring2275997. 2019

Sentient Solutions Ltd. *Guide to Call Quality Monitoring in the Contact Center*. Call Center Quality Assurance. https://blog.scorebuddyqa.com/quality-monitoringin-the-call-center?hs_amp=true. 2020

Sharma, G. Pros and cons of different sampling techniques. *International journal of applied research*, *3*(7), 749-752. 2017

Sharma , S., & Chetiya, A. (n.d.). Implementation of Process Conformance to COPC Standards in a Global BPO Company: A Case Study.

Sibona, C., Walczak, S., & White Baker, E. A Guide for Purposive Sampling on Twitter. *Communications of the Association for Information Systems*, 537–559. https://doi.org/10.17705/1cais.04622 2020

Singh, S. K. Advantages and disadvantages of probability sampling methods in social research. *In National Conference on Innovative Research in Chemical, Physical, Mathematical Sciences, Applied Statistics and Environmental Dynamics* (pp. 14-18). 2015

Supriyanto, A., Wiyono, B. B., & Burhanuddin, B. Effects of service quality and customer satisfaction on loyalty of bank customers. *Cogent Business & Management*, *8*(1), 1937847. https://doi.org/10.1080/23311975.2021.1937847 2021

Thompson, M., & Ramsey, M. H. Quality concepts and practices applied to sampling— an exploratory study. *The Analyst*, *120*(2), 261–270. https://doi.org/10.1039/an9952000261 (1995)

Yeager, N. *Measuring Quality in Customer Support*. Customer Happiness Blog. https://www.nicereply.com/blog/measuring-quality-customer-support/. (2020)

Zhu, A. X., Yang, L., Li, B., Qin, C., English, E., Burt, J. E., & Zhou, C. Purposive Sampling for Digital Soil Mapping for Areas with Limited Data. *Digital Soil Mapping with Limited Data*, 233–245. https://doi.org/10.1007/978-1-4020-8592-5_20 (2008)

Zweig, G., Siohan, O., Saon, G., Ramabhadran, B., Povey, D., Mangu, L., & Kingsbury, B. Automated Quality Monitoring in the Call Center with ASR and Maximum (2006) Entropy. *IEEE International Conference on Acoustics Speed and Signal Processing Proceedings*. https://doi.org/10.1109/icassp.2006.1660 2006

Biographies

Jhamela Mae Gutierrez is a graduating student of Mapua University for Bachelor of Science in Service Engineering Management. Her experience in the campus has gained her interest in business process improvement. She is a driven person who believes that there is always a better and simpler way of doing things.

Jenalyn Shigella G. Yandug is a Professional Industrial Engineer (PIE) with over 15 years of experience. She has earned her B.S degree in Industrial Engineering and Masters of Engineering Program major in IE from Mapua University, Intramuros, Manila, Philippines. She has taught courses in Methods Engineering, Systems Simulation, Engineering Economy and Systems Engineering.