How voice of customer data is being used - part 2

In part one of this article, I started discussing an example of how voice of customer (VOC) feedback is being used by Parking and Transit Services to identify areas of opportunity and make improvements. The team began by using survey feedback to identify factors that customers said are critical to providing quality services. With the list of critical to quality (CTQ) factors created, the team now needed to use another tool to prioritize their projects based on the impact that the projects would have on the customers’ CTQs. To do this, the PTS team used a modified cause and effect matrix.

What is a cause and effect matrix?
To start, let me describe the basic cause and effect matrix (C&E matrix) and how it is used. A C&E matrix identifies which process inputs need to be improved in order to improve the process output. This tool allows you to rank the process inputs so that you can focus your resources on those that will have the greatest impact on your output, and in turn improve the CTQ factors on which your customers place the most emphasis. There are different approaches to creating these matrices, mostly around what rating scales to use. To create a C&E matrix:

1. Identify the critical to quality factors for the process output. In a C&E matrix, you do not want to work with too many CTQs. I would recommend having 10 or fewer.
2. Weight the critical to quality factors on a scale of 1.0-5.0. Some people prefer to use a rating scale of 1.0-10.0. You do not need to use whole numbers, so a CTQ can be given an in-between value like 3.5 or 4.2. Additionally, CTQs can have the same weighting – they do not all have to be different.
3. List each process input.
4. Rate each input based on how much impact it has on each CTQ. A rating of 9 means there is a strong relationship, a 4 would be a medium relationship, a 1 would be a weak relationship, and a 0 indicates that there is no relationship. In this instance, only the whole numbers are used and only 0,1,4,9.
5. For each process input, multiply the relationship value by the weight of each CTQ. Then add all of the resulting values to get a score for that input.
6. Rank the inputs by their final score. The inputs with the highest scores have the greatest impact on the CTQs and are where you want to focus your improvement resources.

Figure 1 shows a very simplified example of a C&E matrix for a hamburger order at a fast food restaurant:
In this example, the customer CTQs are taste, temperature, appearance of the burger, packaging, and the time the customer has to wait for their order. Based on the feedback and input from the process experts, the CTQs were weighted using the 1-5 scale. In this example, taste is weighted the highest.

The relationship between each process input and each CTQ is then rated. Looking at Input #2, ‘Cooking of the hamburger,’ it was decided that the relationship between cooking the meat and how the burger tastes is very strong, so it is rated a 9. Cooking also has a strong relationship to the temperature of the burger and how long it takes to complete the order, so both of these were also rated a 9. Cooking has some impact on the appearance of the burger, but not a very strong relationship, so this relationship was given a 4. Cooking did not have any impact on the packaging.

Next, the score for each input is calculated. For Input #2, ‘Cooking of the hamburger,’ the calculation is:

\[
\text{Calculated Score} = (9 \times 5.0) + (9 \times 4.5) + (4 \times 3.7) + (0 \times 2.5) + (9 \times 4.5) \\
\text{Calculated Score} = 45 + 40.5 + 14.8 + 0 + 40.5 \\
\text{Calculated Score} = 140.8
\]

In this example, the cooking of the hamburger will have the greatest impact on the identified CTQs, followed by the condiments used and hamburger seasonings. To make sure the customer’s CTQs are met, efforts should be focused on ensuring that burgers are cooked quickly and to perfection every time. Improvements will also be made by making efforts to find the highest quality condiments and seasonings.
The modified C&E matrix
The C&E matrix Parking and Transit Services used to rank their projects was created by following the same process as building a standard C&E matrix; but with a couple of modifications:

- The weighting of the CTQs was done by the leadership team and process experts. Each person gave a weighting to each CTQ, and the results were averaged to arrive at the weighting for the CTQ. After the average score was determined, if the group felt the score was not where it should be, the team worked to develop a consensus about the correct weighting value.
- The team decided to include all of the CTQs in the analysis, so all 30 were used to determine the score for the projects.
- The project list replaced the input list. Each project was rated for its impact on each CTQ.
- Each project had the opportunity to affect all of the CTQs in some way, so the ‘no impact’ rating (0) was removed from the relationship scoring, leaving only the 1,4,9 ratings.
- The calculated CTQ Score at the bottom of each CTQ column was used to determine which of the factors was being less affected by the projects. Additional projects can be developed to address these critical to quality factors if needed.

The benefits of using the C&E matrix
As I mentioned in part one of this article, there are a number of factors that need to be considered when prioritizing projects (i.e. what will be gained by completing the project, when the project needs to be completed, associated costs vs. expected benefits, etc.).

In a service environment, how projects will address customer needs is a critical element in decision-making. The PTS team wanted to be sure that their projects addressed critical to quality factors, so the C&E matrix was selected to help with the prioritization. Not only does the tool link efforts to the CTQs, but using a rating system like this provides the team with a logical approach that helps reduce emotional or political influences to resource allocation.

Parking and Transit Services’ results
After all of these efforts, the outcome was a clearly defined priority list which confirmed that one of the projects which the PTS team already considered to be crucial would, in fact, have a greater impact on customer CTQs than any of the others. The team found that projects related to strengthening customer service delivery and projects that improve student engagement and customer interactions needed to be higher in priority. The team also found that they could benefit from adding efforts which would expand
payment options, enhance service interactions with customers, and reinforce staff knowledge of all PTS operations. By using survey feedback, a check sheet and a C&E matrix, Parking and Transit Services has been able to effectively prioritize their efforts and resource needs in a way that will address their customers’ needs, and they are actively working on these efforts. As always, I welcome your questions or comments. You can email me at clayton.taylor@asu.edu.

About the author:

Clayton Taylor, MBA, is the Director, Organizational Performance and a Certified Six Sigma Master Black Belt working in the Office of the Executive Vice President, Treasurer and Chief Financial Officer at Arizona State University. He leads the Organizational Performance Office. He and his team currently consult with diverse Business and Finance and university-wide operational areas to lower costs, improve operational efficiency and provide the highest quality customer experience to internal and external customers. Mr. Taylor can be reached at clayton.taylor@asu.edu.