2006-289: MEASURING CUSTOMER PERCEPTIONS: A COLLABORATIVE PROJECT CONDUCTED BY STUDENTS FOR A MIDWEST TRUCKING COMPANY

Edie Schmidt, Purdue University
Kathyne Newton, Purdue University
Rubina Nashine, Purdue University
Sorraraya Khiegnawongsa, Purdue University
Companies are recognizing the benefits of working with universities on a variety of collaborative projects. The benefits, however, accrue to more than just the companies. The students, faculty, and companies all benefit from such partnerships, educationally and economically. The purpose of this paper is to describe a project that was collaboratively conducted by Purdue University senior and graduate student classes with a moderate-sized Midwest trucking company. The purpose of the project was to develop and implement a survey to identify customer perceptions related to key success factors for the trucking industry in general and the company in particular. This survey was designed to collect customer responses rating a combination of qualitative and quantitative questions. It was also designed with an eye towards “repeatability” so the company may utilize portions of the survey to track progress on key success factors over time. The outcome of the project will serve to direct operational improvements for the company.

This paper describes the process that was used to assist the students develop the survey instrument in participation with the top administration of the company, as well as the methodology used to implement the survey. The timeline used for the project was critical to getting the work completed in one semester, as well as cooperation of the business offices of the university and the trucking company. The division of responsibilities and the inclusion of graduate students in the data analysis phase were also important to project success. Key successes of the project and major hurdles that were encountered will be detailed, in addition to the educational and economical outcomes for the participants.

Background

Purdue University’s Industrial Distribution Program in the Department of Industrial Technology has developed strong relationships with industrial partners that provide multiple benefits for faculty, students and the companies. Businesses are recognizing that the use of faculty and students may complement the personnel needs of the companies. Students and faculty can bring fresh perspectives to problems by participating in classroom projects and consulting work. Additional benefits to the businesses may include: the discovery and use of faculty and students for business problems, the use of faculty for education and training of existing employees, and research to advance business knowledge. The benefits derived by the University from business partners may include: contributions of money for scholarships and internships, use of corporate connections to encourage legislative support for higher education, and personnel to serve as adjunct faculty or lecturers to enhance and augment curricular offerings.

A relatively new partnerships developed during the last two years was with a mid-sized trucking company in the Midwest. This company specializes in long-haul, dry-van trucking and has been an ideal partner for faculty and students to learn about an aspect of the industry that had been largely unexplored in the curriculum. The relationship began with Purdue students taking a company tour, and the company management reciprocated by speaking to students about the trucking industry and company in a student association meeting. Over time, the close proximity of the company, as well as the company’s growing interest in utilizing student talent, resulted in a student project that would help the company learn more about how to improve customer
satisfaction. It was decided that two classes, an undergraduate senior class titled Strategic Distribution Management and a graduate class titled Global Supply Chain Management would develop, administer and analyze results of a customer satisfaction survey addressing a random sample of customers. The undergraduate class consisted of 36 Industrial Distribution students, and the graduate class consisted of 17 students from a variety of technology disciplines. The semester was just beginning so there was very little time to prepare for the project with background research or example surveys.

Initiation of the Project

The first step of the project was the development of a short proposal with key objectives for the project, a short description of the methodology proposed, and survey project actions.

The proposal of the project stated:

“the purpose of the project is to develop and implement a survey to identify customer perceptions related to key success factors for the trucking industry in general and the company in particular. This survey will be designed to collect customer responses rating a combination of qualitative and quantitative questions. It will be designed with an eye towards “repeatability” so the company may utilize portions of the survey to track progress on key success factors over time. The outcome of the project will serve to direct operational improvements for the company.”

The key action steps in the proposal were listed as:

- Development of key success factors and criteria for measurement
- Draft of survey questions and web survey
- Submit request for exemption to IRB for Human Subjects Research
- Tour of company’s trucking facility in Indianapolis
- Focus group/interviews with company employees and company customers to review and refine key success factors and key measures to be included in the survey
- Collection of company data needed to write survey instrument/approval of survey instrument by company management
- Contact with company webmaster
- Receive contact lists from company and plan timeline for pilot test and student implementation of survey
- Pilot test of survey (2-3 people) and make adjustments as necessary, final approval
- Implementation of survey
- Validation of survey results and analysis of data (statistical results and development of graphs)
- Write management report detailing findings, conclusions and recommendations

The proposal was used for four purposes:
1. to determine the resources needed for the project,
2. to get the approval of the trucking company management for project activities, as well as provision for needed financial support and customer information needed for the project,
3. to garner support of the Industrial Technology Department and the Business Office, and
4. to assist with the introduction of the project to the students.

The company management was very eager to proceed with the project and agreed to the proposal details, as well as the request for financial support for transportation to and from the company for two visits during the project, and all telephone/fax costs required to complete the project. The overall cost estimates of the project were minimal, particularly when compared to the cost of the project had it been run under Sponsored Research Programs incorporating faculty salaries and overhead. Agreement for the project to move forward was based on the proposal, timeline (see below) and estimated costs of the class project. Because of the short timeline, it was agreed that if the project was delayed for any reason beyond the semester that the company would support the cost of student labor to complete the project.

Students were each given access to a long-distance telephone account for the time allotted for the project, and because they were given designated phone numbers to call, and a limited number of surveys to complete, the costs were easy to account for.

Project Start

The project was introduced to the students by handing out the project proposal and setting the date for the first visit to the trucking company. The project was met with both interest (the field trip was a real plus for the students) and some concern for the time available for the project. Following is the timeline (based on a 14 week semester) that was provided to the students for the completion of the project. The project was purposely designed to be ambitious on the front end of the semester in order to leave room for any unexpected project delays.

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weeks 1-2</td>
<td>Development of key success factors and criteria for measurement</td>
</tr>
<tr>
<td>Week 3</td>
<td>Tour of company’s trucking facility in Indianapolis</td>
</tr>
<tr>
<td></td>
<td>Focus group/interviews with company employees to review and refine key success factors and key measures to be included in the survey</td>
</tr>
<tr>
<td></td>
<td>Collection of company data needed to write survey instrument/approval of survey instrument by company management</td>
</tr>
<tr>
<td></td>
<td>Contact with company webmaster</td>
</tr>
<tr>
<td>Weeks 3-4</td>
<td>Begin draft/design of survey questions, approval of survey and web survey</td>
</tr>
<tr>
<td>Week 4</td>
<td>Receive contact lists from company and plan timeline for pilot test and student implementation of survey</td>
</tr>
<tr>
<td>Weeks 5-6</td>
<td>Pilot test of survey (2-3 people) and make adjustments as necessary, final approval</td>
</tr>
<tr>
<td>Weeks 7-9</td>
<td>Implementation of survey</td>
</tr>
</tbody>
</table>
Week 10 Validation of survey results and analysis of data (statistical results and development of graphs)
Weeks 11-13 Write management report detailing findings, conclusions and recommendations

The first visit to the company was designed to be an information gathering step that had essentially two groups working with the company as follows:

**Student Visit to Trucking Company: Proposed Activities**

Approximate 3 hour visit to Indianapolis Facility

9:00 a.m.   Arrive at facility, have 30-45 minute tour of facility with focus on key operations. Short question and answer period.

10:00 a.m. - noon Students working with groups according to following table

<table>
<thead>
<tr>
<th>Focus Group/Interviews with Trucking company Employees</th>
<th>Website work – group meeting with Webmaster/IT dept.</th>
</tr>
</thead>
</table>

The top priority for the visit was to gather the information needed to write the survey. A customer satisfaction survey had been completed by the company within the last two years, and that was reviewed to get a sense of what the company had tried to accomplish. Next, a focus group was held with several representatives from the company’s management and customer service area. The focus group began by introducing 4 subject areas that the students had chosen after conducting some basic literature searches regarding the trucking industry. The four sections of interest were:

1. Overall Service
2. Safety & Security
3. Technology

After approximately 2 hours of discussion, that list was expanded to 7 primary areas for the survey to cover. Several ideas for survey questions were also developed from the discussions. The primary areas for the survey were expanded to represent:

1. Sales
2. Administration/Customer Service
3. Driver/Equipment
4. Overall Service
5. Use of Technology
6. Consistency of Service
7. Customer Demographic Survey
The other priority for the site visit was to meet with the IT representatives from the company to get input on Web Design for the survey. It was decided at that time that the Purdue University server was the best place for a Web survey to be launched and maintained from.

Another key issue related to the list of survey respondents. The company agreed to provide a customer contact that included customer names, locations, phone numbers and e-mail addresses within one week.

Survey Design

The survey was originally proposed to be conducted by telephone interview or internet web survey. It was to be relatively short in length so that respondent inconvenience will be minimized. A script would be developed for students to use making contact with customers, as well as training on the basic rules that should be used in conducting telephone interviews. Phone contacts for the University faculty were also made available to the students in case there were any respondent concerns. Initial contact was to be made with respondents (provided by company) by telephone, with the preference for immediate completion of the survey during the conversation. Respondents who were reluctant to complete the survey at that time would be directed to a website for easy completion of the survey on-line. A hard copy of the survey could also be faxed to them for completion and return by fax if preferred.

After the students met with the company, several drafts of the survey were developed, with the final one gaining approval by the sponsoring company management. A couple of trial interviews were also held with customers to get a sense of what problems were likely to up before the class project began. - The final list of questions for the survey are listed below

Survey Questions
1. What is your job title?
2. Is your company a manufacturer, wholesaler/distributor, retailer, 3rd party logistics, or others?
3. What industry do you represent?
4. In which state is your company headquatered?
5. List the top three trucking companies you currently use for long-haul, dry-van trucking in order of preference?
6. Survey Questions
7. What are the primary reasons that you choose to do business with these trucking companies?
8. List and rank the top three reasons you do business with the trucking company.
9. Please rate the following services provided by the trucking company.
10. Is Certification a requirement for your carrier?
11. Does the trucking company meet your Certification Standards?
12. Survey Questions
13. Do you currently use Web tracking system?
14. Is Web tracking system easy to use?
15. Does your company use EDI (Electronic Data Interchange)?
16. What percentage of your shipping is done in North American (including Canada and Mexico)?

A web-based version of the survey was developed and approved by company management; however, it was not used due to the time constraints that began to arise.

The project continued according to the timeline with the exception of one major problem. The company was having a difficult time providing the contact names and phone numbers. The information was not readily available in any database, so customer service representatives were enlisted to help provide the information. That was also not useful, so the information had to be retrieved from the company files manually which took quite a bit of time. The original request was for approximately 500 customer contacts in the hopes that 100 surveys could be completed during the project. The difficulty with the customer contacts changed that to only 150 total contacts, of which 19 were e-mail addresses only. This particular problem delayed the project by 3 weeks, and came close to stopping the project. One reason it was decided to continue was that it would be easier to compete a small number of surveys so it was decided to move forward.

Survey Administration

To begin the project, students were provided with a script, the survey, a list of customer contacts, and a form to use to keep track of their calls. A Purdue University long-distance access code was also provided with instructions for use.

The students were given 10 days to complete as many surveys as possible, and were to report to faculty their progress every two days. This proved to be important to keep students “on task.” There were some time constraints with student schedules, and with varying time zones represented in the sample of customers provided. Some difficulties were found by the students in conducting the surveys. Difficulties included:

- No one answering the telephone
- Requests for call backs and/or fax copies of the survey
- Spanish-speaking respondents
- One-time customers that did not have enough experience to respond to the questions
- Difficulty interpreting responses

After the 10 days on the project, 29 usable surveys were completed and the analysis phase of the project began.

Survey Analysis of Results

Two graduate students in the class were responsible for the statistical analysis of the results. Early preparation of the statistical programs needed to run the data was finished while surveys were being conducted. The last part of the assignment for the students was to develop the management report. The statistical findings were handed out in sections to students (each section repeated once) and they were given the task to create a report that described all the findings. They were required to include graphical and verbal descriptions of all findings, as well
as conclusions and recommendations. The sections were then turned into the faculty for grading and revisions based on request.

Some of the more important findings for the company included the respondent ratings for basic services provided by the company, as well as detailed feedback related to the company's web-based tracking system. The service characteristics were rated on a scale of one to five with five representing the highest rating and one the lowest (see Table 1). The services that customers were most satisfied with included product security, EDI transactions, and condition of equipment. Services that customers were least satisfied with the company were capacity requirements, the communication from pickup to delivery, and the availability of customer support.

<table>
<thead>
<tr>
<th>Services</th>
<th>Avg Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product security</td>
<td>4.48</td>
</tr>
<tr>
<td>EDI transactions</td>
<td>4.38</td>
</tr>
<tr>
<td>Condition of Equipment</td>
<td>4.35</td>
</tr>
<tr>
<td>Product tracking</td>
<td>4.20</td>
</tr>
<tr>
<td>On-time pickup</td>
<td>4.07</td>
</tr>
<tr>
<td>Timely response to customer requests</td>
<td>3.90</td>
</tr>
<tr>
<td>Driver courtesy</td>
<td>3.89</td>
</tr>
<tr>
<td>Timely rate quotations</td>
<td>3.88</td>
</tr>
<tr>
<td>On-time delivery</td>
<td>3.86</td>
</tr>
<tr>
<td>Billing Accuracy</td>
<td>3.81</td>
</tr>
<tr>
<td>Availability of customer support</td>
<td>3.75</td>
</tr>
<tr>
<td>Adequate Comm. from Pickup to Delivery</td>
<td>3.55</td>
</tr>
<tr>
<td>Capacity requirements</td>
<td>3.52</td>
</tr>
</tbody>
</table>

Table 1
Trucking Company Service Ratings

The web-based tracking system was a relatively new offering for customers that allowed them to identify the location of their shipment every thirty minutes via the web. When asked about the tracking system, most customers that used it agreed that it was user friendly and that the most useful features were tracing and tracking. Additionally, features they wanted to see added were more frequent satellite updates, container number identification, reference numbers, and sorting by destination. Perhaps the most important finding relative to the tracking system was that approximately 40% of those surveyed were not aware of the web-based tracking system.

Management Report

The last step was to create a cohesive document for the company management. A PowerPoint presentation was developed for company management. Faculty and students visited the facility for a presentation of the findings, recommendations and conclusions. Some examples of the recommendations for the company are listed below.
Recommendations for the Trucking Company

- Conduct future research and find out the requirements of wholesalers/distributors and retailers in order to increase their customer bases.
- Consider increasing customers in the areas of textile, aerospace, food and chemical industries.
- Conduct future research to find out how Contract Freight, Werner, and Swift operate and what services provided by these trucking companies may be different.
- Continue to provide more efficient service at competitive prices.
- Work to increase availability and advertise to potential customers.
- Benchmark against “best practices” in industry.
- Establish a process that maintains up-to-date certifications to assure that certification requirements are current.
- Educate the company customers in how the company goes about ensuring adherence to certification standards.
- Continuously maintain the user-friendliness of the web tracking system.
- Do a survey to find out what features of web tracking system that are most popular or highly valued by customers and make visible to all customers.
- Enhance promotion of web tracking system to non-users.
- Develop a program to assist customers needing to register to use web tracking system and “walk” them through first-time use.

Recommendations to Improve Research

No class project is without its difficulties. Several recommendations for improving such projects in the future include:

- Make changes to survey questions based on knowledge learned
- Start with more customer names, and more reliable contact information
- Use fewer researchers to make calls to enhance reliability of survey responses
- Increase amount of time allotted to project

The project was beneficial to both the company and the university faculty and students. The company was pleased with the findings, and found several items they believed would help them in their operations. Additionally, several new ideas developed from the results for future research. Currently one M.S. student is working with the company on a project that has become his M.S. thesis, and another class project is being explored. The company also hired two interns to work the summer of 2005, and one recent graduate took a job with the company upon graduation. Student evaluations were also very favorable regarding the project and faculty were provided with opportunities for conference papers and presentations. This collaboration will continue as a result of the positive experience.