


[Return To Previous Page](#)

Using Data Analysis to Identify Six Sigma Sales Projects

By [Prakash Roshan](#)

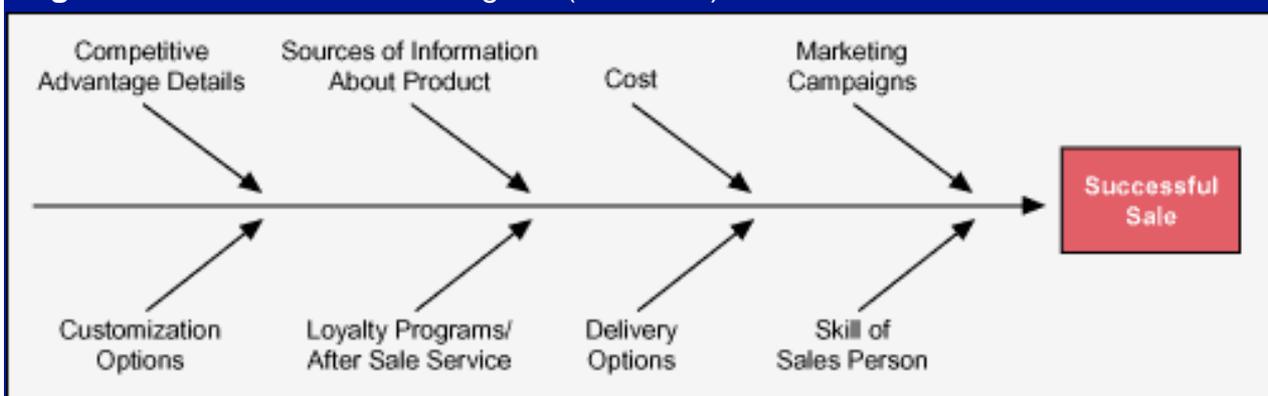
Six Sigma is a useful methodology for identifying sales improvement opportunities. The data-driven approach facilitates correlation of the factors involved in the sales process and helps isolate specific inputs to expand the potential for increasing sales. Analysis of existing sales practices and various statistical sales results provides a good source of project ideas.

As an example, here is sample analysis involving a fictitious company that sells computers and computer peripherals. The analysis begins with the formula $Y = f(x_1, x_2, x_3, \dots, x_n)$, where Y is the output and f is the function of all inputs (x 's). In this particular case, Y (sales) = f (marketing campaigns, salesperson skills, information source, word-of-mouth, etc.)

To begin, the Black Belt works with the project team to determine all possible reasons for a sale. The cause-and-effect diagram is a useful tool in this effort (Figure 1). The reasons identified include the following:

- Marketing campaigns
- Skill of the salesperson
- Various sources of information about the product
- Resellers
- Delivery options
- Long term relationship criteria
- Loyalty programs
- Cost of the product and cost of service
- Competitive advantage knowledge
- Customization and value-added features

Figure 1: Cause-and-Effect Diagram (Fishbone)



Once the inputs are identified, they are correlated with the outputs in a cause-and-effect matrix (Figure 2). The matrix reflects the key process input variables (KPIV) and key process output variables (KPOV), which are subsequently analyzed in Pareto charts (Figures 3 and 4).

Figure 2: Cause-and-Effect Matrix

Outputs \ Inputs	Inputs								TOTAL
	Customer Rating (1-10)	Marketing Campaigns	Salesman Skills	Different Sources of Information	Delivery Methods	Personalised Services	Follow-up on Usage	Competition Knowledge	
Delivered on Time	8	4	4	8	9	8	2	9	288
After Sale Service	9	8	8	9	3	9	10	9	594
Cost	7	8	9	9	1	1	1	9	266
Loyalty Benefits	7	9	9	9	1	10	10	10	406
Information on Product Features	9	10	10	10	1	1	1	10	468
Customization Options	9	10	10	9	9	9	9	9	504
TOTAL		403	410	451	201	310	273	457	

Figure 3: KPIV Pareto Chart

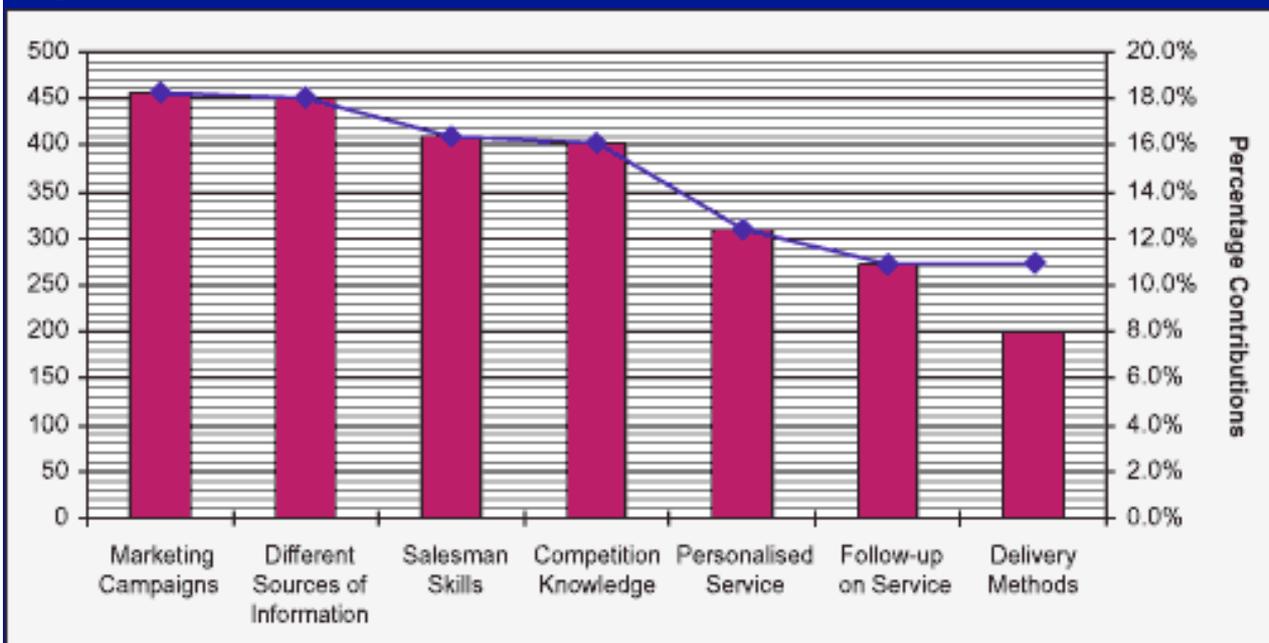
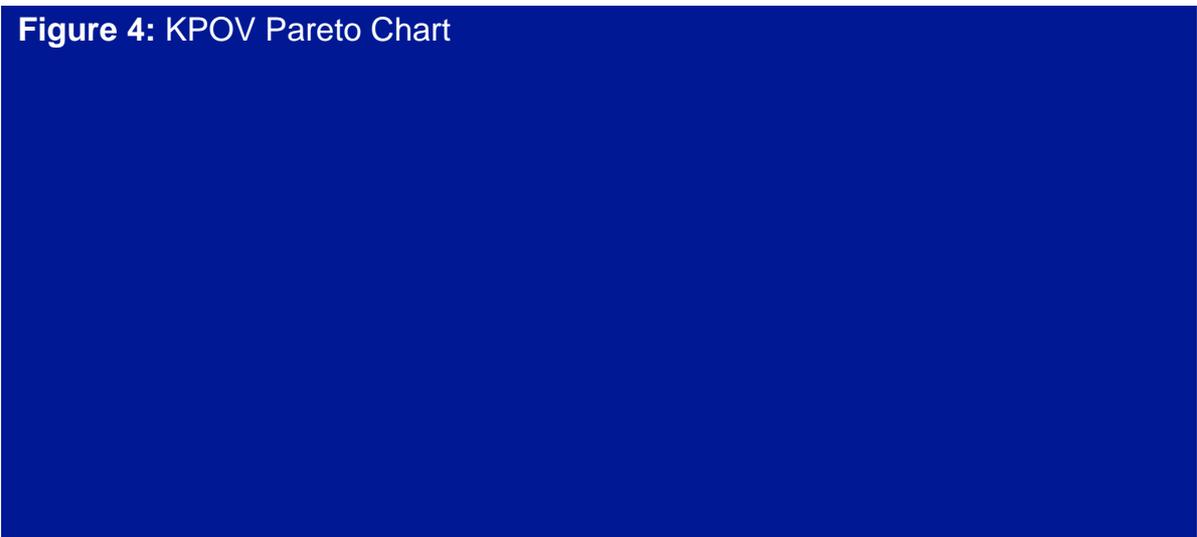
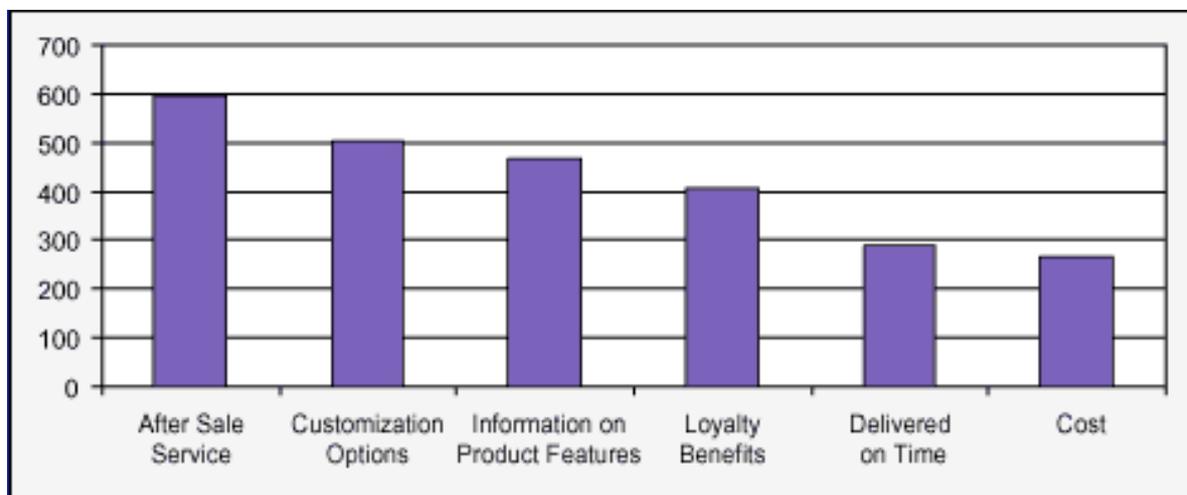


Figure 4: KPOV Pareto Chart





Once the KPIVs and KOPVs are identified, a detailed analysis is conducted for each variable to determine the best project opportunities for increasing sales. Listed by variable, the steps taken to complete this analysis are:

Marketing Campaigns (First Design Input)

The project team gathers data to identify the areas with the highest potential for achieving a successful marketing campaign. It uses the following steps:

Step 1 - Obtain data of personal computer ownership density by:

- Region
- Customer age
- Income
- Gender
- Employment type
- Education
- Computer usage

Step 2 - Determine the type of marketing strategy needed:

- High PC density in one region will require a low-profile marketing campaign associated with value-added services.
- A maximum number of non-users below the age of 15 requires a marketing focus on individual tastes to draw attention to the product.
- High income in one region requires a marketing focus on high-end costly products.
- Create opportunity maps for potential new business by different products.

Different Sources of Information (Second Design Input)

Step 1 - Gather data on all available sources of detailed information for customers to learn about products:

- Call center
- Web sites
- Word of mouth
- Mailers
- Brochures
- Seminars/exhibitions

Step 2 - Determine:

- Which source has the maximum number of inquiries.
- If that source covers all relevant information.
- Which source has the maximum number of confirmed orders.
- Which location to target for a seminar on printers, monitors or PCs.

Salesperson Skills (Third Design Input)

Step 1 - Gather data on the best selling techniques and performance data according to:

- Tenure of agent
- Gender of agent
- AHT of agent
- Communication skills of agent
- Reporting supervisor
- Performance incentives
- Training
- Customer profiling ability

Step 2 - Identify the best combination of the above qualities that would increase sales.

Knowledge of Competition (Fourth Design Input)

Gather data based on the performance of competitors offering similar products:

- Which competitor products have a better market share?
- What critical-to-quality (CTQ) characteristics of the product are instrumental in giving the competition an edge?
- What opportunities and risks are identified through SWOT analysis?
- What is the voice of the customer saying through the Kano analysis?

Personalized Service (Fifth Design Input)

Gather data based on:

- The number of existing customers who have received value-added service.
- The various ways personalized service is provided.
- The MTTR between complaints.
- The various methods used to identify purchasing patterns.
- The efficiency with which customers' future needs are anticipated.

Follow-Up on Usage (Sixth Design Input)

Gather data based on:

- The methods employed to assure customers of a long-term relationship.
- The number of customers who have gone to the competition after their first purchase.
- The number of customers who have upgraded to a higher cost or quality product.
- The percentage of customers who have received a follow-up call after delivery of the product.
- The level of impact (positive or negative) of the follow-up process on customer satisfaction.
- The number and type of incentive programs offered to customers who refer new customers.

Once all the design input information is obtained, it is used to create a quadratic or polynomial equation to uncover correlations between the sales data.

$$Y = A_0 + ax_1 + ax_2 + ax_3 \dots + ax_N$$

Where Y = sale, A = constant from a regression analysis, a = a numerical value which, if high equates to the x being considered more important, and x = input variables.

Benefits from Hypothesis Testing

Additional benefits are gained through hypothesis testing. Examples of test statements for the sample company include the following:

A larger more substantial marketing effort provides a more intimate customer relationship than a smaller effort. The hypothesis test results drive marketing methods used to ensure a sense of accountability among the sales representatives. The salespeople serve as either sales consultants or aggressive marketers.

An indirect sales model is more efficient than a direct sales model. The hypothesis test results determine whether direct mailers for customers are more effective than incentives to resellers for good promos.

An educated customer equals a successful sale. The hypothesis test results, which incorporate an assessment of the number of customers who call in the first time for information versus the number who purchase a product, determine the strength of the existing information dissemination process.

Conclusion: Attaining a High Sigma Value

Analysis from each of the above design input categories can form the basis for a Six Sigma project. The objective is to identify the best combination of design inputs that work together in a cohesive manner to attain a high sigma value.

About the Author

Prakash Roshan is a Black Belt with six years experience in the quality field. He is employed by an information technology company implementing Six Sigma for processes in its call center and business process outsourcing division. He can be reached at prakashroshan@hotmail.com.

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[Return To Previous Page](#)