Quality Control Support System

Problem Description

PutItOn Co. is a company that designs and produces various clothing lines. The company uses the Internet and a catalogue to advertise and sell its products. Every season the company offers new designs and prepares a catalogue featuring these items. Recently, the management has noticed an increase in the returns of a particular style of sweater that was sold during the Christmas season. The management is concerned about this phenomenon and wants to identify the problem areas and repair the mistakes.

The return policy requires that the customer indicate the reasons for returning the product. The customers are provided a number of reasons to choose from. This data will then be used to identify the reasons for the quality failure. The aim of this project is to build a decision support system that will facilitate the data analysis.

Excel Spreadsheets

1. The following spreadsheet lists the reasons for returning the product.

1 Large	2 Small	3 Quality
10 overall	20 overall	30 seem defective
11 chest/bust	21 chest	31 material defective
12 waist	22 waist	32 assembly defective
13 seat/hips	23 seat	33 instruction missing
14 rise	24 hips	34 color does not match
15 too long	25 too short	35 finish not acceptable
16 too wide	26 too narrow	36 parts missing
17 too loose	27 too tight	37 does not work

2. Build a spreadsheet that presents the data about each return. Below we present a sample of the data collected from the returned sweaters.

Cust. ID	Primary Cause	Secondary Cause	Tertiary Cause	Procurement
1	12	34	37	Internet
4	21	22	25	Catalogue
5	16	15	35	Christmas catalogue

User Interface

1. Build a welcome form.
2. Build a data entry form for Spreadsheets 1 and 2.
3. Build a form that enables the user to update the data in Spreadsheet 2. Include five combo boxes to allow the user to choose which field of the table to update. Include a text box where the user enters the identification number of the customer whose data will be updated. Include a text box where the user types the new value. Insert a

command button that, when clicked on, updates the data in Spreadsheet 2 using the information given by the user.

4. Build a form that enables the user to analyze the data in Spreadsheet 2. In this form, include the following:

   a. A frame that has two option buttons. One option button allows the user to sort the information in Spreadsheet 2 based on the primary cause of return. Within each group the information is sorted based on the secondary cause of return and then based on the tertiary cause of return. The second option button allows the user to sort the information in Spreadsheet 2 based on the procurement mode. Within each group sort the information by primary, secondary, and tertiary causes of return. Include a command button that, when clicked on, sorts the information in Spreadsheet 2 based on the user's request and opens the spreadsheet.

   b. A frame that includes a number of option buttons. Option buttons allow the user to view the following statistics: the five reasons that were selected most of the time as a primary reason for return; the five reasons that were selected the least number of times as a primary reason for return; the five reasons that were selected most of the time as a secondary reason for return; the five reasons that were selected most of the time as the tertiary reason for return, etc. Insert a command button that, when clicked on, identifies the statistics described above and returns the results.

   c. A command button that, when clicked on, performs a Pareto analysis using the algorithm described below and presents the corresponding results. Pareto analysis is used very often to identify product/process quality problems. This analysis indicates that 20% of the reasons cause 80% of the quality problems. In here we describe the steps one should follow to complete the Pareto analysis: (i) calculate the total number of returns; (ii) for each cause of return, calculate the total number of customers that have selected it as the primary cause of return; (iii) for each cause of return, calculate the percentage of returns, sort the information in descending order of the percentage return, and calculate the cumulative percentages; (iv) repeat steps (i) to (iii) for the secondary and tertiary causes of return.

Design a logo for this project. Insert this logo in the forms created above. Pick a background color and a font color for the forms created. Include the following in the forms created: record navigation command buttons, record operations command buttons, and form operations command buttons as needed.

Reports

1. Build a summary report with the results from the Pareto analysis.
2. Report the top three problem areas that are causing the return of sweaters.

Bonus

3. Build a histogram that presents the frequency of returns for each reason of return. In the same graph include the cumulative frequency curve.

Reference

Montgomery, D.C., Runger, G.C., “Applied Statistics and Probability for Engineers”, 3rd Ed., *John Wiley & Sons*, 2003.