

# Improving quality to improve profits

[Business](#), [Management](#)



Improving Quality to Improve Profits XXXXXXXX BUS 642: Business Research Methods & Tools Prof. Donna Wall September 10, 2012 ? Improving Quality to Improve Profit Public companies continuously experience pressure to increase profits for shareholders. One method of increasing profits is to reduce expenses. One expense Schlumberger management believes is totally within the company's control is the first pass yield of their products. Specifically, Schlumberger management believed that raising the first pass yield of their product to at least 99% would result in at least a 1% increase in profit.

As Fawcett & Calantone (2000) point out " quality's relevance extends to its ability to reduce costs of defective work. Crosby estimated that the cost of quality are equivalent to 15 to 20 percent of sales revenue and argued that if quality were improved, total cost would inevitably fall, increasing firms profitability" (par. 22). As a result, Schlumberger management authorized a study to validate their hypothesis and determine specific focus areas to place resources that will maximize the effort for achieving results.

To start the validation, the research team decided to utilize the specific research process charted in Business Research Methods written by Cooper and Schindler. As Cooper and Schindler (2011) point out " good research generates dependable data that are derived by professionally conducted practices and that can be used reliably for decision making" (p. 12). Cooper and Schindler (2011) go on to state " good research follows the standard scientific method: systematic, empirically based procedures for generating replicable research" (p. 2). As a result, this particular study will follow the process of clearly define the purpose, provide process details, thoroughly

plan the research design, provide high ethical standards, reveal any limitations honestly, provide adequate analysis for the decision makers, present findings unambiguously, justify the conclusions, and reflect the researcher's experience. The first step in the overall process is to clearly defined purpose. To complete this step we need to answer the following questions.

Question one is what is the management dilemma? Question two is what are the management questions? Question three is what are the research questions? And the fourth question is what are the investigative questions? In this case, the management dilemma is how to increase profit margin. The management question is if we increase first pass yield to 99%, will profit margin increase by at least 1% given everything else stays equal? The research questions are what areas of the business should management allocate resources to improve first pass yield?

The investigation questions are 1) what is the current first pass yield of our manufacturing facilities? 2) What is the first pass yield of each manufacturing facility? 3) What is the first pass yield of each product group? 4) What is the first pass yield of our incoming material from all suppliers? 5) What is the first pass yield of each active supplier? 6) What is the current profit margin? Next in the overall process is to create an operational definition for the study. In this particular study specific definitions are needed.

For consistency, we will utilize the Association for Operations Management (or APICS) definitions for operating profit and first pass yield. APICS defines profit margin as " the difference between the sales and cost of goods sold for <https://assignbuster.com/improving-quality-to-improve-profits/>

an organization. " According to APICS first pass yield is defined as " the ration of products that conform to specifications without rework or modification to total input. " This definition will be used in our manufacturing facilities as well as incoming material from our suppliers.

Other terms that need to be defined for clarity include Schlumberger manufacturing assembly site facility, supplier, approved supplier list, and current active suppliers. Schlumberger manufacturing site will be defined as any manufacturing or assembly site Schlumberger owns. A supplier will be defined as any company delivering components, sub-assemblies, or final products that are not owned by Schlumberger. Approved supplier list will be defined as the list of suppliers approved by Schlumberger through the Quality Manufacturing and Safety (QMS) Audit and first article processes.

Current active suppliers will be defined as any supplier that has supplied components, sub-assemblies or end products to Schlumberger within the last year. Part numbers will be considered active if Schlumberger has ordered or received a part number in the last year and has a forecast or purchase order placed for delivery within the next two years. Items that are considered out of scope for this study include software, services, facilities contractors, and transportation services. Any new products not released prior to the start of this study will also be considered out of scope for this research.

The primary method of gathering data will be to analyze and consolidate the raw information currently in the corporate databases. These databases include Approved Supplier List, eQuality, Incoming Inspection, Quest, and Finance. The research team does not plan to conduct any formal surveys at this time. The research team will consist of at least one person from each

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of the potential stakeholders. These stakeholders will include Finance, Quality, Supply Chain Management, Procurement, Manufacturing, and InformationTechnology(IT).

Schlumberger has several databases with significant raw data in each. The team realizes that obtaining and consolidating this information in a usable form might require the help of IT resources and potentially delay the overall results of the study. The research team plans to obtain the following information from the data available in the databases. The team will begin gathering data closest to the end customer and move upstream in the process flow to analyze the major process points along the supply chain.

As a result, the team will review the current overall first pass yield for all Schlumberger manufacturing sites, each individual manufacturing site, and each product line. In addition, the research team will analyze the first pass yield at incoming inspection from the suppliers. This information will be analyzed at a global level, by supplier, and by Schlumberger manufacturing site location. The team will also determine how many suppliers are in the approved supplier database and compare this number to the current active suppliers.

Since Pareto Analysis is such an important data analysis tool, this research team plans to utilize this approach as the primary method of organizing the data. As Karuppusami & Gandhinathan (2006) point out a Pareto Analysis is a QC tool that ranks the data classifications in the descending order from the highest frequency of occurrences to the lowest frequency of occurrences. The total frequency is equated to 100 percent. The "vital few" items occupy a substantial amount (80 per cent) of cumulative percentage of occurrences

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and the "useful many" occupy only the remaining 20 per cent of occurrences" (par. 2). Utilizing Pareto Analysis will provide an easy way to determine where to focus resources for maximum benefit. Analyzing the resource allocation and budget needs to support this study reveals we need a core team of six people, a budget of \$350, 000, and four months to present the teams findings. At least one team member will represent the following functions in the company. These functions include Finance, Quality, Supply Chain Management, Procurement, Manufacturing, and IT. The Finance Vice-president will be the champion of the study.

Other employees will be involved as needed to complete the research. The budget includes salaries of the team members for four months, researching internal databases, potentially developing IT scripts to extract needed data and potentially visiting manufacturing facilities and suppliers to validate data or obtain additional detailed information. As in any research project, handling the study with the highest ethics is extremely important. As Cooper and Schindler (2011) point out "the goal of ethics is to ensure that no one is harmed or suffers adverse consequences from research activity" (p. 2). Cooper and Schindler (2011) go on to state "unethical activities are pervasive and include violating nondisclosure agreements, breaking participant confidentiality, misrepresenting results, deceiving people, using invoicing irregularities, avoiding legal liability, and more" (p. 32). Although this research team does not plan to conduct 'official' surveys, the team will conduct interviews with various participants to verify the data. In each case, the research team will disclose the nature of the study before engaging participants.

Although Schlumberger has a strict no retaliation policy in the company, the final research report will not include the specific employee names of Schlumberger or suppliers employees. The primary focus of the study will be following and presenting the data related to product quality and increasing profits. The research team will honor all nondisclosure agreements and report the overall facts honestly. Consistent with company and standard research policy, the highest safety practices will be used throughout the study.

Consistent with the research approach, the research team analyzed the data for the company owned manufacturing sites, first. This raw data revealed Schlumberger has a total of twenty-seven company owned manufacturing sites located in nine different countries. To review the first pass yield of these facilities, the research team reviewed a total of 4, 376 quality records posted during 2012. The overall first pass yield for all twenty-seven facilities is 82 percent. The three facilities with the lowest first pass yields are all located in the Houston area.

The three product lines with the lowest first pass yield are Pressure and Sampling (59%), Seismic (67%), and Drilling (71%). Next, the team began to analyze the information regarding our supplier performance. Based on the raw data, Schlumberger has a total of 5, 778 approved suppliers. Of these suppliers 63% (or 3640) are considered active suppliers by definition. Of these active suppliers, twenty suppliers account for 61% of the line items delivered to the twenty-seven facilities. Three specific suppliers have the lowest first pass yield. These three suppliers are Freeport (46%), Harrison (61%), and Tenaris (63%).

Based on public financial records, the current profit margin is recorded as \$0.98 per share in Q1FY12 and \$1.02 per share in Q2FY12. This translates into \$1.303 billion in Q1FY12 and \$1.40 billion in Q2FY12. A one percent increase in profit would increase earnings by just over \$13 million per quarter. To validate the first pass yield data, the research team visited four company owned manufacturing sites each in North America, Europe, and Asia. Two of the facilities visited in each region recorded the highest first pass yields in that region.

Two of the facilities visited in each region recorded the worst first pass yields in that region. During these visits, the research team took a tour of each facility, conducted an audit of the quality records and interviewed key members of each manufacturing team including the Process Engineers, Quality Engineers, Incoming Inspection and Finished Goods Inventory Warehouse Managers. During the audit, the research team reviewed each facilities documented processes, actual processes utilized and the data recorded in the quality database.

To the research team's surprise, the methods utilized in each of the facilities were not consistent - either documented or in actual practice. The North American and European facilities utilized and practiced the definition of first pass yield consistent with the research team's definition. However, the Asian manufacturing facilities did not record the actual first pass yield per our definition. Instead, if a product failed testing, the Asian facilities would retest the product. If the product passed testing during the second or even the third test and passed, they recorded a positive first pass quality yield.



The finding of inconsistent data records in the Asian facilities weakened the confidence in the raw data analyzed previously. However, it did uncover an opportunity to strengthen the company's overall processes. In summary, the raw data suggests Houston manufacturing facilities have the three low yields of the twenty-seven in total. However, these facilities might not be the lowest yields because the research team uncovered inconsistencies in the data collection definition and process between the Asian manufacturing facilities and the European or North American facilities.

As a result, a further study is recommended of the Asian facilities to determine how significant the overall raw data is skewed by them utilizing a different process to collect and record first pass yield. At the same time resources should be placed in the Houston facilities to raise the first pass yield from the current low level to 99%. Since the data and process for collecting and recording the data for the supplier first pass yield is consistent, the research team is confident in the results achieved.

It is the recommendation of the research team to focus resources on the three lowest yielding suppliers. These resources should conduct a more detailed analysis to uncover the Pareto Analysis of the top defects. Once the top three defects are determined, the root cause and appropriate corrective actions can be determined to raise the first pass yield to the appropriate levels. Reviewing the financial evidence suggests a 1% increase in profit is achievable if the overall first pass yield of Schlumberger manufacturing facilities rises to 99%.

To achieve this high yield levels quickly, the company will need a systematic and consistent approach across all facilities and suppliers. One such process <https://assignbuster.com/improving-quality-to-improve-profits/>

to consider is implementing a combined Lean and Six Sigma continuous improvement approach in each manufacturing facility and with our suppliers. Since determining the cost of implementing Lean and Six Sigma process is out of scope for this research team, a further study would be needed to determine the cost of implementing significant process improvement versus the potential 1% benefit per quarter.

Throughout this research the team worked well together. Having a process to follow made the overall activities much easier to accomplish in a systematic way. All members believed the success of this study was largely due to the planning at the beginning of the process. To keep the project on track, it was important to define exactly what activities were in the scope of the project and what was considered out of scope. When the team uncovered inconsistencies, in data collection or processes, we were able to document the information and continue progress toward the overall goal.

Now that this study is complete the information will be recorded in our company Quest database for future reference. References APICS definitions First Pass Yield <http://www.apics.org/dictionary/dictionary-information?ID=1543> Profit Margin <http://www.apics.org/dictionary/dictionary-information?ID=3188> Cooper, D. R. and Schindler, P. S. (2011). Business research methods (11th ed. ). New York : McGraw-Hill Irwin Fawcett, S. E. , & Calantone, R. J. (2000).

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