**How United States could assist India and Pakistan to tackle the Kashmir problem.**

Dr. Pradeep B. Deshpande[1], Prashant Srivastava[2], and Subhash Bansiwal[3]

The authors have prepared this proposal for resolving the Kashmir issue with six sigma principles. Successful implementation of six sigma on this issue will contribute to regional prosperity and perhaps promote global peace. In the Forward to the recently released monograph, "**A Small Step for Man: Zero to Infinity with Six Sigma**", the Dean of Kellogg School of Management at Northwestern University wrote, "*The most likely problems have the most unlikely solutions*'. This observation perfectly fits the proposal. In the monograph, the first author presented the theory of rise and decline of cultures based on scientific scrutiny. The theory permitted the author to predict the rise of India (and China) in the early nineties. The theory suggests South Asia being a region that is rising, there are fundamental reasons why the Kashmir problem can be solved and the efforts to tackle it ought to be pursed. We propose that six sigma is the way to resolve it and outline a formal methodology for accomplishing the task.

**Background.**

This proposal is pivoted on the conviction that if the dissatisfaction levels of people on both sides of Kashmir could be sufficiently reduced, the issue of which nation the two sides may want to be a part of will likely wither away. As a consequence, a number of avenues for the economic development of the entire region will open up. The principal aim of the proposed project therefore is to drastically reduce the dissatisfaction levels of people on both sides of Jammu and Kashmir. Taking a stock of the situation on the ground after six decades of independence of India and Pakistan, it is clear the problem persists and needs to be solved regardless of who may have been right and who may have been wrong.

Jammu and Kashmir is a picturesque region located in the northern most part of the Indian subcontinent. India won independence from Great Britain on August 15, 1947. On August 14, 1947 Pakistan came into existence as a sovereign state. Since partition, India has controlled 2/3 of Kashmir, while the remaining 1/3 has been under Pakistani control. India and Pakistan both claim Jammu & Kashmir as their own. Three wars have been fought over it. The 1998 nuclear explosions by India and Pakistan heightened international concerns about peace and stability of the region with wider implications of a global nature. Restless conditions have prevailed in Kashmir for decades. Violence and armed conflict in the Kashmir region in recent years have caused enormous hardship to the residents prompting many on the Indian side of Kashmir to move to other parts of India.

The first author has shown from first principles why an emerging nation cannot join the ranks of developed nations if defect levels in its products and services remain high. He has also shown that six sigma is the approach to reducing defects in all repetitive activities. The current exercise at resolving the Kashmir issue will provide both India and Pakistan a tremendous asset in the form of six sigma to deploy for further economic development and wellbeing of their peoples.

**The Approach.**

To begin, it is necessary to conduct a scientific investigation to gage the specific issues citizens on both sides of Kashmir are dissatisfied with in a prioritized order. For this purpose, a suitable survey instrument must be designed for use in polling. Then, the survey instrument must be used to get feedback from a sample of the population. The combined population of Kashmir is in millions and it is impractical to poll the entire population; the scrutiny must be based on an appropriately-sized stratified random sample of the heterogeneous population. Specialized skills are essential for both of these tasks. Gallup, Inc. is internationally recognized in these areas. The result of the survey will be a prioritized list of customer critical to quality requirements (CTQs).

In complex problems such as this, the customer critical to quality requirements will be fuzzy and unsuitable for direct six sigma implementation. The fuzzy CTQs must be translated so as to render them suitable for six sigma analysis. This translation is carried out with a tool called Quality Function Deployment (QFD). An illustrative House of Quality that QFD utilizes is shown in Figure 1.
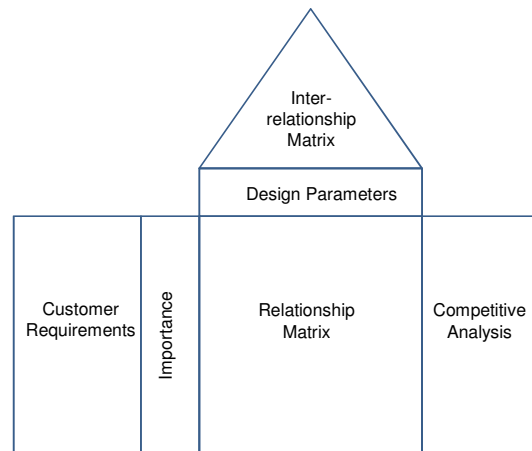


**Figure 1. The House of Quality**

In the House of Quality, information is organized in several matrices. The leftmost matrix labeled "Customer Requirements" has a single column and a number of rows, one for each customer critical to quality requirement. The next matrix to its right labeled "Importance" also has the same number of rows and one column as the matrix on its left. Each row of the Importance Matrix lists the weightings for each critical to quality requirement since not all CTQs are equally important to customers.

Success with six sigma is contingent on the ability to uncover outcomes labeled "Design Parameters" in Figures 1 that strongly correlate with the customer critical to quality requirements. The Design Parameters Matrix has the same number of rows as the matrices to its left but the number of columns equals the parameters or "outcomes" which are strongly correlated with the critical to quality requirements. The central idea is to uncover all the Design Parameters that the CTQs depend on. These Design Parameters are either actionable items or they must be further translated leading to actionable items.

If all this is done right, improving the performance of all the actionable items will lead to an improvement in the Design parameters and in turn to improvement in the CTQs.

As an illustration, suppose customers are dissatisfied with the level of noise coming from their dishwaters. The inability to resolve this problem could mean loss of market-share for the manufacturer of the appliance. Merely knowing that there is excessive noise coming from the dishwater does not point to a path forward for improvement. This CTQ must be translated into one or more actionable outcomes. In the specific example of the noisy dishwater, it may be that brainstorming by the six sigma project team members drawn from the manufacturing units of various subassemblies has led to the tentative assessment that an injection molded part, a gasket' is the cause for excessive noise. Further investigation has also led to the conclusion that the injection molding process used in the manufacture of the gasket is running off spec. A formal experimental study undertaken to improve the performance of the injection molding process which when successfully completed will result in a reduction in the noise level from the dishwater.

Returning to the problem at hand, a team of domain experts must be assembled to translate each of the critical to quality requirements into design parameters and actionable items. This exercise may involve multiple translations, not just one. The translation is deemed to be complete when an actionable item is found.

The matrix on the top in Figure 1 is the "Roof" of the House of Quality. The roof matrix lists how the design parameters are directionally inter-related. It addresses the question which direction would the other design parameters move if a specific design parameter is moved up or down. These inter-relationships help the practitioner determine in which direction a specific design parameter could be moved without scarifying the performance of other design parameters.

The matrix on the extreme right labeled "Competitive Analysis" lists how "our" product or service is doing in each of the critical to quality requirements vis-à-vis the competition. In the context of the problem under scrutiny it will list the current performance. The numerical values to list in this matrix in this case will likely not be available; they will be available once Step 7 of the six sigma methodology has been completed. Finally, a target for each of the design parameters would be needed which if achieved will lead to an improvement required for competitiveness. These will have to be selected taking into account the resources available.

The next step is to prepare the Project Charter. Each design parameter identified in Figure 1 will have associated with a number of repetitive work processes with outcomes requiring improvement. A project charter will have to be prepared for each of these work processes. The Project Charter provides the following information: (1) A brief description of the problem or problems customers are experiencing leading to defects, (2) The names of outcome(s) with units and dimensions, (3) Estimation of current defect levels if available, (4) Project Goals – this is of course is a guesstimate since the extent of natural variability in the outcome is not known at the start of the project, (5) The name of the project sponsor/mentor responsible for providing resources and removing bottlenecks, project leader, and names of team members, and (6) start date and expected duration of the project.

The five-phase eleven-step six sigma methodology must be implemented on the outcomes of each of these repetitive work processes. The procedure for Implementing six sigma on one of these work processes is outlined in the following paragraphs. The entire procedure must be repeated on all work processes.

- **Step 1** is to **Formulate the Problem Statement** articulating what is giving rise to customer dissatisfaction (e.g., 35% of train arrivals are more than 10 minutes late).
- In **Step 2**, we define the outcome of this work process (e.g., **Arrival Time, Minutes from Target**).
- In **Step 3**, the project goal (e.g., **Reduce Late Arrivals, let us say, by 50%**) is stated. The desired improvement is speculative at this point since we do not know the extent of natural variability present in the process. Nonetheless, the benefits of defect reduction will likely be substantial. An estimate of the financial benefits if the targeted goals are realized should be included. The information for Steps 1-3 can be lifted from the Project Charter.
- In **Step 4 Process Map** is drawn showing all the steps in the process including the linkages between steps. The process map in the case of the Train Travel Process should include all the steps from the time the train leaves the origination station till it arrives at the destination station.

The *Karma* concept states that the outcome of this process, Arrival Time, is impacted by causes. It does not tell us what the causes are. The causes are determined with six sigma and then worked on them to improve the outcome performance. Customer dissatisfaction has emerged as an issue because there is excessive variability in the outcome, that is, the average is not where it should be or could be and the standard deviation is too large. Some of the observed variability in the outcome will be due to common causes which we cannot do anything about within the scope of the problem being scrutinized, but a lot of the variability may be due to causes that we can do something about (known as assignable causes). Every one of the steps on the Process Map is a potential assignable cause, i.e., a possible contributor to the variability in the outcome (defects). In a future step, the specific causes responsible for introducing variability in the outcome will be determined from among all the potential causes.

- **Step 5** is to **Validate Measurement Systems**. The central idea in this step is the variability in the outcome must come from causes (any one or more of the steps on the process map) and not from errors in the measurement systems. Take as an example, a Voting Process involving voters coming into a polling booth for voting in an election. Here, voters fill out ballot papers, which are processed by a vote-counting machine, and the interpreted results are generated. Clearly, we would want the variability in the outcome (Interpreted Results) to come from assignable causes (Voter Intent) and not from the errors in measurement systems (confusing ballot paper design, error-prone vote counting machines). In fact, such errors must be a very small fraction of the margin of victory between the top two candidates or else the election results would be suspect. It is extremely important to validate measurement systems before proceeding to the next step in the six sigma implementation strategy.
- **Step 6** is to **collect Data on the Outcome(s)** [response variable(s)] for the purpose of determining the starting defect levels.

- **Step 7** is to scrutinize the data collected and **Establish the Current Defect Levels**. It is important to establish the baseline (current performance) so improvement from six sigma can be properly catalogued.
- In **Step 8 Properly Designed Procedures** are employed to collect data on the potential causes and the response variable(s). As previously stated, every one of the steps on the process map is a potential cause for defects.
- **Step 9** involves analyzing the data collected for **Identifying the Causes** (called major impact factors or vital few causes) that are responsible for introducing variability (defects) in the outcome.
- In **Step 10** the **Major Impact Factors** so determined **are either set at the optimal values or are eliminated** as appropriate. When this is done, the average of the response variable moves in a favorable direction and the standard deviation decreases and all the benefits of six sigma accrue.
- The last step, **Step 11** is to put a plan in place to **Monitor Response Variable(s)** so benefits of six sigma are sustained and the problems once fixed, stay fixed.

Successful implementation of six sigma on the process will lead to improvement in the performance of the associated Design Parameter in Figure 1. When six sigma is implemented on work processes associated with all the design parameters, significant improvement in all CTQs will be realized and the benefits of six sigma will accrue.

**Gallup's HumanSigma Approach.**

The first author's innovative solution of applying the six sigma approach to resolve Kashmir problem may be augmented and enhanced when combined with Gallup's HumanSigma approach. The program can also effectively leverage Gallup's strong measurement science and research. As mentioned earlier in the proposal, authors have a strong conviction that if dissatisfaction levels of people on both sides of Kashmir are reduced, the region could open up for and experience considerable economic development. This is likely to ensure that current problems and conflicts will wither away. Gallup's HumanSigma approach combines the science of customer and employee engagement to ensure that variability arising in the delivery of services is reduced. The variability could be arising from measurements, processes, and unassignable causes. Gallup's vast experience in measuring a wide variety of issues will help in reducing variability in the measurement. Unassignable causes which drive variability can primarily be attributed to the people responsible for delivering the services. HumanSigma will help in reducing this variability by addressing people involved in delivering as well as receiving these services. For improving the satisfaction levels, it will be important to understand the expectations of people and measure their current levels of satisfaction. In addition to understanding the expectations of the people, it will also be necessary to identify factors, which are driving the satisfactions levels of people. The expectations of people will be defined and finalized using a combination of survey and brainstorming methodologies. The survey will be conducted on a selected sample and brainstorming with selected experts, and other stakeholders in the Kashmir dispute. These expectations will also be used as an input to improve the process of delivery using the six sigma approach. Once expectations are clearly defined, the current levels of satisfaction will be measured using a combination of customer engagement science and research. The level of satisfaction will be measured using a substantial sample covering people of both sides

of Kashmir and may cover agencies and service providers in areas like health services, water, sanitation, electricity, education, law & order, and roads etc. HumanSigma approach believes that if people who are delivering the services are satisfied with their agencies or departments they are likely to deliver better quality. It is therefore equally important to measure their current levels of satisfaction. For this measurement, all employees in the agencies or departments which are considered important in terms of customer expectations will be covered. Gallup's employee engagement tool will be used for this measurement.

**Discussion.**

The project will take many years to complete. However, visible progress would be seen in a year or so. This project will require total support of the federal Governments of India and Pakistan as well as the two State Governments Kashmir. Major opposition party leaders should be invited to scrutinize the proposal and the proposed activities need to be continued regardless of which party is in power. A total dispassionate commitment of all team members to rely solely on data throughout the project, and not on emotion, will be essential to the successful completion of the project. Six sigma has done wonders in a very large number of organizations. However, six sigma can fail without the firm commitment of senior management.

**Forward Action Plan.**

SAC and Gallup, Inc. jointly offer to engage with the concerned Governments to pursue the ideas outlined in this proposal. Specifically, Six Sigma and Advanced Controls, Inc. will train a group of twenty professionals in the wherewithal of six sigma in a two-week workshop. The concerned Governments are expected to depute participants to the workshop. Participants are expected to have at least a baccalaureate degree and should have had a course in statistics while in college. Upon the completion of the workshop, participants are expected to have the know-how of implementing six sigma on the Kashmir problem as outlined in this proposal. Participants under the leadership of two individuals, one from India and the other from Pakistan, will serve as project co-leaders. SAC will serve as Adviser to continue guiding the team of participants for one year. Gallup, Inc. will be responsible for survey instruments & stratified sampling of heterogeneous populations and will guide the group with the process of getting feedback from the random sample of the population leading the information on CTQs and the Importance Weightings for Figure 1. Depending on the nature of the CTQs, the team may be able to complete six sigma implementation on one or two work processes. The team would have to continue with six sigma implementation on all the CTQs until they are in line with what they would be for the best operated processes.

**References.**

The following individual may be approached to comment on the merit of this proposal.

**1.** Dr. Imad M. Alatiqi (Ph. D., Lehigh University), Secretary General, Private Universities Council, Ministry of Higher Education, State of Kuwait.

**A note from the first author:** The first author considers it a high privilege to have had a professional association with Dr. Alatiqi for the past two decades. Imad is one of the most enlightened leaders in the Middle East. He previously served as Dean of Engineering at Kuwait University and is a member of the Supreme Petroleum Council of

Kuwait. He is currently leading an effort to spread six sigma in private colleges and universities in Kuwait with the intention to grow the initiative into a national movement in association with the author. Dr. Alatiqi sees the merit of the fundamental ideas of this proposal to possible use in Kuwait as well. He understands that there are limits to achievable performance as regards transformational movements in societies presently in decline such as Iraq (this does not mean we should not put forward our best effort), but he also knows that Kuwait not being a stratified sample of the heterogeneous population of Iraq, the theory of rise and decline does not place a theoretical limit to achievable performance in his nation. The ramifications of success of the six sigma enterprise in Kuwait are very significant not only for his nation but also on neighboring Iraq and on the Middle East at large.

 **Further Reading.**

**Deshpande, P. B.,** *Advances in Six Sigma and Process Control*, To Appear in Chemical Engineering Progress, Mid 2009.

**Deshpande, P. B.**, "A Small Step for Man: Zero to Infinity with Six Sigma*"*, Six Sigma and Advanced Controls, Inc., January 2008.
**Deshpande, P. B., Six Sigma Enlightenment,** *Business World*, 4 October 2004.
**Deshpande, P. B., Makker, S. L., and Goldstein, M.**, *Boost Competitiveness with Six Sigma,* Chemical Engineering Progress, September 1999.
**Deshpande, P. B.**, *Globalization, Economic Development, and Competitiveness: Opportunities and Challenges*, R. N. Maddox Distinguished Lecture, University of Arkansas, Fayetteville, AR, April 23, 1998.
**Deshpande, P. B.**, *Emerging Technologies and Six Sigma*, Hydrocarbon Processing, April 1998.
**Fleming, John H. and Jim Asplund, Jim**, "Human Sigma- Managing the Customer-Employee Encounter", Gallup Press, 2007.
**Harry, M. J. and J. R. Lawson**, "Six Sigma Productivity Analysis and Process Characterization", Addison-Wesley, Reading, MA (1992).

_____
[1] Professor Emeritus of Chemical Engineering, University of Louisville, Visiting Professor of Management, Gatton College of Business & Economics, University of Kentucky, and President and CEO, Six Sigma and Advanced Controls, Inc., Louisville, Kentucky.

[2] Prashant Srivastava is Country Head & Managing Partner, Gallup India Pvt. Ltd. (A 100% Subsidiary of Gallup Inc.), 1st Floor, Vaswani Chambers, 264-265, Dr Annie Besant Road, Worli, Mumbai 400030

[3] Subhash Bansiwal is Partner and City Center Manager, Gallup, Inc., New Delhi, India