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TOTAL QUALITY MANAGEMENT IN THE FEDERAL GOVERNMENT IMPLEMENTATION OF TQM IN FEDERAL AGENCIES RECEIVING THE FEDERAL QUALITY INSTITUTE QUALITY IMPROVEMENT PROTOTYPE AWARD 1990-1992

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Total Quality Management in the Federal Government

Implementation of TQM in Federal Agencies Receiving the Federal Quality Institute Quality Improvement Prototype Award 1990-1992

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Abstract: The paper attempts to analyze case studies of federal agencies which have been deemed successful at implementing total quality management (TQM) to (1) identify which components of TQM (based on W. Edwards Deming's Fourteen Points) are being implemented in those agencies, and (2) identify the pathway of implementation. As a result, it can be determined whether selected federal agencies have been able to implement all components of orthodox TQM, and which strategy or model for the implementation of TQM in federal government have been used successfully.

Abstract

Can the orthodox components of Total Quality Management (TQM), as represented by Deming's Fourteen Points be successfully implemented in federal agencies? This project examines ten case studies produced by federal agencies which have been awarded the Quality Improvement Prototype award by the Federal Quality Institute to 1) identify which components of TQM are being implemented in those agencies, and 2) identify the pathway of implementation. All components of TQM are identified as being used by the agencies, with seven of the ten agencies implementing ten or more components. Also, a TQM Implementation Model has been developed from the findings.

Table of Contents

Index of Figures

"Declining budgets and increasing demands are forcing government managers to look for new and better ways to improve products and services for taxpayers. Experience has shown that a focus on total quality can make dramatic contributions to these objectives. The Federal quality strategy seeks to identify and satisfy customers, to continuously improve the quality of products and services, and to involve everyone. Interest in the Federal quality effort is rapidly growing."

United States Office of Personnel Management
Federal Quality Institute (1992)

INTRODUCTION

Total Quality Management (TQM) works in Japan, the Ford Motor Company, Xerox Corporation and the Johnsonville Sausage Company. But can TQM work in the federal government?

The Federal Quality Institute (FQI) was established by President Ronald Reagan in 1986. Its purpose is to recognize quality organizations and to promote TQM education throughout the Federal Government (Burstein and Sedlak, 1988). FQI presents the Quality Improvement Prototype and Presidential Quality awards in recognition of those organizations in the Federal Government which have achieved high quality and customer satisfaction at reduced costs by practicing Total Quality Management. These awards are comparable to the Malcolm Baldrige National Quality Award, presented each year for excellence in the private sector.

The FQI describes TQM as "a strategic, integrated management system for achieving customer satisfaction. It involves all managers and employees and uses quantitative methods to improve an organization's processes." TQM is based on cooperation rather than adversarial competition or ranking, and recognition of the interdependence of the components of a system. At the micro level, the goal is customer satisfaction; at the macro level, the aim is optimization of the whole system. Everyone, including top management, supervisors, employees and suppliers become involved in continuously and systematically working to improve the quality of goods and services, and the processes for delivering them. As such, TQM is an overall management philosophy--a way of doing business--that embraces, rather than replaces, any sensible management method or process. It is a strategic and holistic approach to improving performance by changing an organization's culture (Jasper, 1992).

However, there are some who scoff at instituting TQM in federal agencies, and even more who are not even aware of its existence. In his *Public Administration Review* article, James E. Swiss (1992), North Carolina State University, calls TQM a "complicated and demanding system." He argues the orthodox form of TQM expressed in the works of W. Edwards Deming and others will not work well in government, and proposes implementing only selected portions of TQM. Others have suggested that TQM is just a newer version of the "quality circles" tried in the 1980's. Their conclusion is that TQM is just another management fad like Planning Programming and Budgeting System (PPBS), Zero-Base Budgeting (ZBB), and Management by Objectives (MBO).

The purpose of this paper is to analyze case studies of federal agencies which have been deemed successful at implementing TQM to 1) identify which components of TQM are being implemented in those agencies, and 2) identify the pathway of implementation. As a result, it can be determined whether selected federal agencies have been able to implement all components of orthodox TQM, and which strategy or model for the implementation of TQM in federal government has been used successfully.

THE DEVELOPMENT OF TOTAL QUALITY MANAGEMENT (TQM)

W. Edwards Deming: The Father of TQM

W. Edwards Deming (1982, 1986), who is still conducting seminars at the age of 90-plus, first introduced the application of statistics to the quality control of war materials and manufactured products during World War II. Deming earned his Ph.D. in physics at Yale, worked for the U.S. Department of Agriculture and U.S. Bureau of Census, then eventually taught for many years at the Graduate School of Business Administration, New York University. Hired by the U.S. War Department during W.W.II, Deming taught Statistical Process Control (SPC) to the defense industry. U.S. Occupation forces invited Deming to Japan in 1947 where he assisted in a number of studies.

He was invited to return by the Japanese Union of Scientists and Engineers (JUSE), and lectured repeatedly on SPC to statisticians and industrial managers. Japan enlarged his ideas and included internal customers (people inside an organization who depend on the input of other workers) and all employees, not just the managers. This marked the transition in Japan's quality control activities from dealing primarily with manufacturing-based technology to a management tool for total quality control (Mann, 1985). The Japanese credit Deming with providing them with the method by which they were able to produce quality products and become competitive on an international scale.

Deming developed his Fourteen Points during the mid-1950's to improve manufacturing and service quality and productivity on a continuous basis. The Fourteen Points as originally found in Deming's *Quality, Productivity and Competitive Position* (1982) are:

1. Create constancy of purpose towards improvement of product and service.

2. Adopt the new philosophy.

3. Cease dependence on mass inspection.

4. End the practice of awarding business on the basis of price tag alone.

5. Constantly and forever improve the system of production and service.

6. Institute modern methods of training on the job.

7. Institute modern methods of supervision.

8. Drive out fear.

9. Break down barriers between departments.

10. Eliminate numerical goals for the work force.

11. Eliminate work standards and numerical quotas.

12. Remove barriers that hinder the hourly worker.

13. Institute a vigorous program of education and training.

14. Create a structure in top management that will push every day on the above 13 points.

In addition to the Fourteen Points, Deming's philosophy of "Profound Knowledge" seeks to "optimize the system" through cooperation rather than adversarial competition, bringing together managers, supervisors, employees, unions, suppliers, customers, environment and the community. The four components of his philosophy of quality are 1) Appreciation for a System, 2) Theory of Variation, 3) Theory of Knowledge, and 4) Knowledge of Psychology (*A Day With Deming*, 1991). In order to assist in the transition necessary to apply TQM to the service-oriented government sector, the following overview and interpretation of Demings philosophy and Fourteen Points has been developed for this project.

Overview and Interpretation of Deming's Philosophy

This overview and interpretation is from *A Day With Deming,* a 1991 seminar sponsored by The Chief of Naval Operations. Quotes are by Deming.

Deming's Philosophy of Profound Knowledge: Deming seeks to "optimize the system" within which managers, supervisors, employees, unions, suppliers, customers, environment and community exist, based on cooperation rather than adversarial competition. Deming breaks down his philosophy of quality into four components, all of which are interdependent, with components often overlapping into other areas. They are:

1) Appreciation for a System
2) Theory of Variation
3) Theory of Knowledge
4) Knowledge of Psychology

Deming's Philosophy of Appreciation for a System: The system is interdependent. It requires knowledge of the inter-relationships between all the components within the system and of the people who work in it. Performance of any component is to be judged by its contribution to the aim of the system, not the individual production or profit, nor any other competitive measure. When the components all work for each other, individual interests are served and everyone wins.

Competition is the nemesis of cooperation. Deming sees it as a failure when management ranks people. Someone is always higher, someone always lower. He calls it "Forces of Destruction" and notes it begins with grading in school and continues with merit systems, judging people and putting them into slots, competition between people, groups, divisions, countries, as well as incentive pay, pay for performance, business plans with reports on monthly or quarterly targets, and quotas for production. Deming says this gives a false report; it is the system that is being rewarded, not the individual.

The aim of the system must be clear to everyone in the system; the aim is a value-judgment. The aim proposed in TQM is for everybody in the system to gain. The aim for employees is to provide them with good leadership, opportunities for training and education for further growth, plus other contributors to joy in work and quality of life.

Optimization means accomplishment of the aim: everybody gains. Failure to optimize, or sub-optimization, causes loss to everyone in the system. For optimization, a system must be managed. Management's responsibility is to strive toward optimization of the system, and keep it optimized over time. Growth in size and complexity of a system, and rapid changes with time, require overall management of the efforts of the components. An additional responsibility of management is to be ready to change the boundary of the system to better serve the aim. If the aim, size or boundary of the organization changes, then the functions of the components will change for optimization of the new system. Time will bring changes that must be managed to achieve optimization. Deming believes precise optimization is not necessary. One need only to come close to optimization, as precise optimization would be hard to define.

Deming advocates that if economists understood the theory of a system, and the role of cooperation in optimization, they would no longer teach and preach salvation through adversarial competition. They would, instead, "lead us into optimization, in which everybody would come out ahead, including competitors."

Deming's Philosophy of Theory of Variation: Deming acknowledges there will always be variation "between people, in output, in service, in product." Two mistakes are often made in trying to improve a product (or service); getting mixed up between when a problem is due to a special cause and when it is due to a common cause. This is the basis of Statistical Process Control and is identified through the use of Shewart control charts and other methods.

Knowledge of the interaction of forces is important; an action may reinforce efforts, or it may nullify efforts. It is important to know the effect of the system on the performance of people. Also important is knowledge of the dependence and interdependence between people, groups, divisions, companies, and countries.

There is a distinction between enumerative studies which produce information, such as a Census or a sampling, and an analytic problem, which is the interpretation of results of a test or experiment. The analytic problem interpretation of results is a prediction that a specific change in a process or procedure will be a wise choice, or that no change would be better; either way, the choice is a prediction.

Deming's Philosophy of Theory of Knowledge: The theory of knowledge helps to understand that management in any form is prediction. Deming gives the example that the simplest plan, i.e., how to go home at night, requires prediction that one's automobile will start and run, or that the bus or train will arrive. Management acts on a causal system and on changes in the causes. Management of a system is action based on prediction. Rational prediction requires systematic learning and comparison of predictions of short-term and long-term results from possible alternative courses of action.

Deming stresses that even though a major portion of his quality management theory rests with Statistical Process Control, one must be guided by theory, not by figures: "Theory is knowledge . . . beware of figures." Statistical theory, used cautiously with the theory of knowledge, can be useful in the interpretation of the results of tests and experiments, to understand cause and effect relationships. The interpretation of the results of tests and experiments is for future use: it is for prediction.

Deming points out that companies showing a profit may actually be using very poor long-term strategies. "To copy an example of success, without understanding it with the aid of theory, may lead to disaster."

Deming's Philosophy of Knowledge of Psychology: Psychology helps in understanding people and the interactions between a leader and his or her people and any system of management. A leader must be aware of the differences in people and then use this awareness for optimization of everyone's abilities and inclination. Management cannot operate under the supposition that all people are alike. People learn in different ways and at different speeds. Leaders have an obligation to make changes in the system of management that will bring improvement based on this knowledge.

People have an innate need for self-esteem and respect. "Some intrinsic motivators rob employees of dignity and of self-esteem. If for higher pay or higher rating, I do what I know to be wrong, I am robbed of dignity and self-esteem." Pay is not a motivator because then joy in work and innovation become secondary to a good rating. With extrinsic motivation one is ruled by external forces. One tries to protect what he/she has, avoids punishment, and there is no joy in learning.

Deming says monetary rewards are over-justification due to a faulty reward system and resignation to outside forces. It throttles repetition as the worker loses interest in such pursuits. "Monetary reward is a way out for managers who don't understand how to manage intrinsic motivation." Present norms of management squeeze out innate intrinsic motivation, self-esteem, dignity, and instead they build fear, self-defense, and extrinsic motivation.

Deming calls for a transformation in government, industry and education, a transformation into a new system of reward. The individual must be restored; this will release the power of human resources contained in intrinsic motivation. The result will

be cooperation on problems of common interest between people, divisions, companies, governments and countries.

If this transformation were to take place, the result would be greater motivation, applied science, technology, expansion of the market, greater service, and greater material reward for everyone. There would be joy in work, joy in learning. A person enjoying his or her work is a pleasure to work with; everyone wins--there are no losers.

"Man's job is to govern the future, not simply be a victim of the wind blowing this way and that way." Everyone is already providing their best efforts, but . . . "best efforts will not do it." Everyone must recognize one's own weaknesses and short comings and transform one's own self first, then the system.

Overview and Interpretation of Deming's Fourteen Points

The following overview and interpretation is based on a variety of sources, as noted, as well as personal observation. It is written to specifically address the use of Deming's Fourteen Points in a government agency.

1. Create constancy of purpose for improvement of product and service.

This refers to the development and institutionalization of a long-term commitment by top management to the optimization of the system within which the agency exists. It is the recognition that the components and boundaries of a system change, requiring overall management for the purpose of continuously improving the products and services of the agency. The specifics of this step will vary depending on the system. For example, it might be reflected in the development of a strategic plan whereby management recognizes their responsibility and commits to providing a firm foundation for quality and productivity throughout the system. It is not a one-time commitment; it is a constant, continuous process, and is reflected in management's daily procedures.

2. Adopt the new philosophy

Deming's philosophy requires a major change in the culture of an agency. "We can no longer live with commonly accepted levels of mistakes, defects, materials not suited to the job, people on the job that do not know what the job is and are afraid to ask, handling damage, failure of management to understand their job, antiquated methods of training on the job, inadequate and ineffective supervision" (Deming, 1982). The new philosophy will include the components found in Deming's Fourteen Points and Profound Knowledge relative to optimization of the system.

Inefficiency due to the size and complexity of the bureaucracy is no longer accepted. Quality in all internal and external processes is emphasized; agencies must increase their efforts to streamline their processes (Milakovich, 1990).

3. Cease dependence on mass inspection.

"Routine 100 percent inspection is the same thing as planning for defects, acknowledgment that the process cannot make the product correctly, or that the specifications made no sense in the first place. Inspection is too late, ineffective, and costly. In place of 100 percent inspection should go improvement of the process and elimination of inspection" (Deming, 1982). Improve the process of providing a product or service so that inspection and the rework needed to correct mistakes become unnecessary.

4. End the practice of awarding business on price tag alone.

"Price has no meaning without a measure of the quality being purchased" (Shewhart 1931, as noted in Deming, 1982). "Without adequate measures of quality, business drifts to the lowest bidder, low quality and high cost being the inevitable result. American industry and the U.S. Government, civil and military, are being rooked by rules that award business to the lowest bidder" (Deming, 1982).

Meaningful measures of value as well as price should be developed. Deming advocates moving toward a single supplier for any one item, and building a long-term relationship of loyalty and trust. The emphasis of most governments on finding the lowest bidder usually leads to an unused inventory of low-quality parts, cost overruns, and low-quality service. Purchasing departments and procurement officers have the responsibility for initiating change, providing leadership, and accomplishing the transformation in this vital area (Milakovich, 1990).

Cohen and Brand, in "Total Quality Management in the Environmental Protection Agency" (1990), suggest working with contractors and grantees to understand and help improve performance, even to the point of having major contractors provide continuous quality improvement training for the people who work on government projects, while working within the constraints of federal rules and regulations.

5. Constantly and forever improve the system of production and service.

"This means continual reduction of waste and continual improvement of quality in every activity: procurement, transportation, engineering, methods, maintenance, locations of activities, instruments and measures, methods of distribution, accounting, payroll, service to customers. Continual improvement of quality brings continual rise in productivity" (Deming, 1982).

Public officials often think in terms of "programs," an organized sequence of tasks that has a beginning, a middle, and an end. "TQM must be continuous, with breakthroughs to higher levels of goal attainment resulting after processes become visible, stable, and under control" (Imai, 1986, as noted in Milakovich, 1990).

In government, entire staffs are organized to analyze policy issues, budgets, and information systems. But, rarely is an entire staff devoted to analyzing or helping to improve how an organization performs every aspect of its day-to-day work (Cohen and Brand, 1990).

6. Institute modern methods of training on the job.

"Training must be totally reconstructed. Poor training of . . . workers, or none at all, and dependence on unintelligible printed instructions, seem to be a way of life. Sweeping changes are necessary" (Deming, 1990). It is not enough to improve a work process; people need to be taught how to use the new technique (Cohen and Brand, 1990).

Internal customers, the employees, must be supplied with the proper training, tools and methods; external customers must be given the proper specification for supplies and services. It is important to know what exactly is needed, how results will be defined and measured operationally, and how the achievement of a goal will be measured (Milakovich, 1990).

7. Institute modern methods of supervision.

"Supervision belongs to the system, and is the responsibility of management" (Deming, 1982). The question a manager must answer is, "Do we know how the real work is done?" It is particularly difficult when the work process leads into another unit's procedures. Instituting leadership is difficult and requires long-term commitment. It is difficult to change ingrained habits. For instance, meeting quarterly targets becomes more important than accomplishing the goals that the targets were intended to help measure (Cohen and Brand, 1990).

Methods used in the past have proven ineffective towards increasing both productivity and improving quality. New behavioral techniques and management practices are required to transform public cultures. Supervisors must now coach their subordinates by learning who needs special assistance or intensive guidance and training, and then working with these individuals to enhance their job performance (Milakovich, 1990).

8. Drive out fear.

"Most people on a job, especially people in management positions, do not understand what the job is. Moreover, it is not clear to them how to find out. Many of them are afraid to ask questions or to take a position. The economic loss from fear is appalling. It is necessary for better quality and productivity, that people feel secure . . . Another related aspect of fear is inability to serve the best interests of the (agency) through necessity to satisfy specified rules, or the necessity to satisfy, at all costs, a quota of production (or service), no matter if the materials be unsuitable or machines out of order" (Deming, 1990). William W. Scherkenbach, in *The Deming Route* (1986), believes "removal of fear" should be the first of the Fourteen Points, as it affects nine other points.

"Management by objectives, management by numbers, and management by results can all be reduced to their common denominator: management by fear . . .

Frederick W. Taylor's 'scientific management,' and Peter Drucker's management by objectives, made fear the primary tool of management and considered 'extrinsic' motivation to be the only way of instilling employee loyalty and increasing productivity" (Milakovich, 1990).

Mutual respect by all components within the system is of prime importance. It is difficult to assess and improve performance if staff members are afraid to be honest about what is going on. It requires an "amnesty" concept which allows a person revealing a problem, who may be concerned about the reaction from the boss and coworkers, to show it is the problem that is being addressed, not the person (Cohen and Brand, 1990). Suggesting new ideas is often risky. People are afraid they may lose their promotions, or even their jobs. Superiors may feel threatened and retaliate in some fashion.

9. Break down barriers between staff areas.

Management must work to ensure that each part of the organization respects, understands, and works with the other parts of the organization (Cohen and Brand, 1990). Everyone must work together to address the special causes of problems, take steps to eliminate destructive interdepartmental competition, and replace it with cooperative teamwork. Communication across functions is essential (Milakovich, 1990).

10. Eliminate numerical goals for the work force.

Eliminate targets, slogans, pictures, and posters urging employees to increase productivity without providing methods. "Posters and slogans . . . never helped anyone to do a better job. What is needed is not exhortations, but a road map to improvement, management's obligation" (Deming, 1982).

Empty goals such as "Zero Defects," "Increase Output by 10 Percent," and "Reduce Accidents by 5 Percent," hinder attempts to achieve quality. The emphasis must be on providing employees with the means of doing their jobs, not just setting

higher standards and then cutting corners when work is not completed on time or within the budget (Milakovich, 1990). The focus is on improving a process, rather than achieving a preset, possibly unrealistic goal. By creating conditions that empower employees to make changes in the work processes, it makes targets and exhortations irrelevant.

11. Eliminate work standards and numerical quotas.

"Quotas take account only numbers, not quality. A work standard is a fortress against improvement of quality and productivity" (Deming, 1982). The quality of service should be stressed rather than numbers. Incentive pay and the merit system are based on work standards and numerical quotas (Milakovich, 1990).

12. Remove barriers that hinder the hourly worker.

While Deming focuses this point on the hourly worker, it also applies to the public sector. "Barriers and handicaps rob the hourly worker of his birthright, the right to do a good job" (Deming, 1982).

Cohen and Brand (1990) cite that most government agencies and private sector firms find themselves pushing their services or products out in the last week of a month or the last month of a year in order to make their quotas or their end-of-year numbers. The crunch is then on, despite the quality slogans.

Management must provide equipment, training and "intrinsic" motivation and reinforcement for doing the job right. Management must stop blaming individual employees for system problems (Milakovich, 1990).

13. Institute a vigorous program of education and training.

"Management has a new job: so has everybody else" (Deming, 1982). While Point 6 deals with training to develop the skill and knowledge necessary to do the job, Point 13 deals with the need to encourage and provide resources so that people may develop. This point calls for the development of intrinsic motivation. Each person is

responsible for judging what is of importance for the development of his or herself in order to better contribute to the aim of the system (Aguayo, 1990).

Education and training are required to learn the Fourteen Points so that the transformation can take place. In order for top management to make the corrections and adjustment to processes, training in statistical control techniques must be provided, especially at the supervisory and middle management levels (Milakovich, 1990).

14. Create a structure in top management that will push every day on the above thirteen points.

"Top management will require guidance from an experienced consultant, but the consultant cannot take on obligations that only the management can carry out . . . Everyone in a company (agency) needs a road map toward constant improvement in knowledge and effectiveness" (Deming, 1982).

Management is responsible for organizing itself to accomplish the preceding thirteen points. Management must establish systems and procedures that enable staff to excel. They must also find the resources needed so that staff can do their job (Cohen and Brand, 1990).

Other Contributors to the Development of TQM

Whereas Deming is considered the "father" of Total Quality Management philosophy, many people have enlarged and added to the concept. Most notably, Statistical Process Control (SPC), developed by Walter A. Shewhart, was the backbone of total quality management as it was originally taught by Deming. Shewhart used SPC for improving quality in mass production manufacturing at Western Electric in Chicago. In his book *Economic Control of Quality of Manufactured Product* (1931), Shewhart advanced that potential information is generated by all industrial processes and developed simple methods to chart averages of measurements sequentially. This would create a "series of pictures" that would show fluctuations in the process which could then be used as a tool to determine when the system was exhibiting more than simple random variation.

In this way, "local" sources of trouble, for example, individual workers who may need more training, or inferior equipment, could be identified. When there were inordinately large deviations from normal operations of a system because of the unexplained local causes, it was impossible to evaluate the effects of changes in design, training, purchasing policy, etc., made in the system by management. By eliminating local sources of trouble, the process would then remain in statistical control, and at that point, innovations leading to improved productivity could be achieved.

Deming was a student and friend of Shewhart. He realized the tremendous potential of Shewart's methods and other statistical aids for continuous improvement of a production process and the delivery of a quality product. He eventually extended the methods to service industries.

Several others have been instrumental in molding TQM into the overall management concept that exists today. A major contributor is Joseph M. Juran (1989), who expanded SPC methods to all functions in an organization. He began studying Abraham H. Maslow's hierarchy of needs and David N. McGregor's Theory Y. He

also was invited to teach statistical quality control techniques to the Japanese several years after Deming (Milakovich, 1990). Juran estimated 15% of the problems in organizations are due to local causes that can be handled by the workers. Management is left with the remaining 85% of potential improvement through changes in the system. Workers can identify problems that cause inefficiencies, but only management can change the process (Mann, 1985).

The "Juran Trilogy" presents steps for applying familiar business concepts of planning, control and improvement to quality leadership. Those steps are:

Quality Planning:

> the activity of developing the products and processes required to meet customers' needs.

Quality Control:

> the process of evaluating actual quality performance, comparing it to performance of quality goals and acting on the differences.

Quality Improvement:

> a means of raising quality performance by establishing the infrastructure needed to secure annual quality improvement, identifying the specific needs for improvement (the improvement projects), and establishing a project team with clear responsibility for bringing the project to a successful conclusion, providing the resources, motivation, and training needed by teams to diagnose the causes, stimulating establishment of a remedy and establishing controls to hold the gains.

Adding to the growing base of knowledge, Philip B. Crosby (1979, 1984, 1986), advocates a three-part Total Quality Management plan: determination, education and implementation. Well-known for his controversial "zero defects" attitude, Crosby states "quality is free," and, "what costs money are the unquality things--all the actions that involve not doing jobs right the first time." He moves management through a "Quality

Management Maturity Grid," beginning with Uncertainty, and advancing through Awakening, Enlightenment, Wisdom, Participating, and Certainty. He emphasizes the importance of training and education for management and employees at all levels. Crosby also has a Fourteen-Step plan to guide the implementation of TQM:

Step One:	Management Commitment
Step Two:	Quality Improvement Team
Step Three:	Quality Measurement
Step Four:	Cost of Quality Evaluation
Step Five:	Quality Awareness
Step Six:	Corrective Action
Step Seven:	Establish an Ad Hoc Committee for the Zero Defects Program
Step Eight:	Supervisor Training
Step Nine:	Zero Defects Day
Step Ten:	Goal Setting
Step Eleven:	Error Cause Removal
Step Twelve:	Recognition
Step Thirteen:	Quality Councils
Step Fourteen:	Do It Over Again

Also important to the development of contemporary TQM, Japanese quality leader, Kaoru Ishikawa (1982) was largely responsible for the adaptation of Deming and Juran's teachings to the Japanese culture. He helped create "quality circles" which are small teams of managers, workers and supervisors, trained in statistical process control and group problem solving. This resulted in a constant flow of ideas for improvement, derived from objective and scientific study coming from everyone in the organization, all aimed at satisfying the customers.

More authority was given to employee teams to plan and carry out their daily work. Iskikawa moved Japan away from what had developed into an overemphasis on SPC. He emphasized that data obtained by the use of measuring instruments and chemical analysis should be considered suspect as it may hide the true condition or be presented in such a way as to distort the true quality factors necessary to draw conclusions.

Other Japanese quality facilitators who adapted Deming's work to the Japanese culture and workplace are Genichi Taguchi (1986) and Masaaki Imai (1989). Taguchi applied experimental design techniques to product design and production. This added better and faster methods of product planning. He redefined the relationship with suppliers, calling them "vendor relationships.

Imai analyzes the Japanese application of TQM and links Japan's success to "kaizen" which is defined as improvement in personal life, home life, social life, and working life. Applied to the workplace, it means continuing improvement involving everyone--managers and workers alike. Imai concludes there are differences between the Japanese and American approach; the Japanese are process oriented, while Americans are results oriented, placing high marks on "just getting the job done." He contends this has resulted in motivation towards the "bottom-line" with little regard for the long-term effects.

TQM in the United States

TQM did not begin to gain recognition in the United States until 1980 when NBC television presented the white paper, "If Japan Can . . . Why Can't We?" which recounted how Deming went to Japan and taught Statistical Process Control to the Japanese. Six months later, the Ford Motor Company began implementation of quality improvement as a competitive strategy, embracing Deming's concepts. Other manufacturing companies followed suit.

As success began to become apparent in the private sector, TQM began to spread to service-oriented companies and organizations. Federal, state, county and local governments began to explore individual components of TQM such as quality circles, employee involvement, productivity improvement, participatory management concepts, and special purpose project teams.

In 1984, TQM training was implemented in several areas of the Department of Defense (DOD), and was mandated agency wide in 1988. Armand V. Feigenbaum (1951) was instrumental in convincing the DOD to institute a Total Quality Management system. He stressed the need to involve all departments and was the first to use the term "Total Quality Control" (McGovern, 1990).

However, often only portions of TQM were implemented in a piecework fashion in government organizations. An organized system for innovation and empowerment was missing. Some became convinced the entire integrated system of Total Quality Management, as set forth by Deming and others, would provide the systematic approach needed (USDL, 1992).

TQM: Will it Work in Federal Agencies?

More than three thousand companies and approximately forty governments in the United States now practice some form of TQM (Milakovich, 1990). In 1992, the Federal Quality Institute received thirty applications from federal agencies for the Quality Improvement Prototype award. TQM has been steadily spreading in the federal government, yet many senior executives surveyed recently by the Federal Executive Institute Alumni Association said their agencies haven't yet joined the movement (Jaspar, 1992).

Articles on Total Quality Management appearing in professional journals reflect both advocacy and rejection. On the positive side, Carr and Littman (1990) describe TQM as a "holistic management philosophy, not just isolated techniques."

Michael E. Milakovich (1990) calls it,

> "An option that achieves continuous quality improvement without additional resources by emphasizing intensive examination of relationships between existing management processes, 'extended' customer-supplier requirements, and a response to valid customer demands . . . both a management philosophy and a method of process improvement that is now being applied to the public sector on a broad scale."

Cohen and Brand (1990) discuss the effort to apply the techniques of continuous quality improvement in the U.S. Environmental Protection Agency, stating public managers find themselves trapped, and must first break out of the self-defeating bureaucratic patterns that accept the absence of failure as a substitute for true success. Their view of TQM is that increased productivity involves reducing waste in the production, marketing and supply of products or services. Rather than allocating the majority of brain power to understanding complex concepts of finance and technology, attention should also be focused on how work gets done.

Ehrenberg and Stupak (1992) postulate that TQM expands on systems theory by combining it with a strong dose of the theoretical themes evolving out of the humanist school. Strategic planning and measurement are based on the satisfaction of the customer. They suggest the "new paradigm" for public administration will be to emphasize the totality of the organization as well as the integrated totality of the theories of public administration under the mantle of TQM. For them, "Quality just may be the organizational equivalent of truth in the decades ahead."

On the negative side, James E. Swiss, argues in "Adapting Total Quality Management (TQM) to Government," *Public Administration Review* (July/August 1992), that the orthodox form of TQM expressed in the works of Deming and others will not work well in government. He reasons TQM is unworkable due to its stress on products rather than services, on well-defined consumer groups, on inputs and processes

rather than results, and on an organizational culture with a single-minded preoccupation with quality. He does see hope for a limited "reform TQM" approach, which would emphasize client feedback, performance monitoring, continuous improvement and worker participation.

Swiss believes Deming's approach to improving organizational processes and inputs in order to improve quality is in direct contradiction to the rationale of "all recent government management reforms." He proclaims program budgeting, zero base budgeting, management by objective, and pay for performance all attempted to move the government manager's focus away from measuring inputs and processes and towards results, while TQM urges business managers to move in the opposite direction. Swiss states:

> "TQM is an extremely demanding regimen. It requires all members of an organization to constantly change in order to improve, even after achieving what seems to be a high standard of performance. It requires such high levels of performance that virtually no mistakes are made, and after-the-fact inspections to catch mistakes become unnecessary. Because TQM is so demanding, only an unusually intense and unambiguous organizational culture can keep workers committed and focused."

Swiss calls for the implementation of only chosen components of Deming's Fourteen Points, calling orthodox TQM "ill suited to most government agencies," and representing a step backwards away from results. He would not eliminate output goals and measurements, would de-emphasize demands for output uniformity and organizational culture continuity, and would sensitize managers to the "dangers of satisfying just an immediate clientele."

Tom Shoop (1991) asks, "Why is total quality management taking so long to catch on in government?" He reasons that government deals mostly in services and TQM success has been mostly in functional areas closely related to manufacturing.

Other areas noted by Shoop which inhibit the use of TQM in the Federal government are:

- It is not a part of government culture in that the incentive to increase quality and improve customer satisfaction is lacking.
- Federal laws such as those governing contracting, are very restrictive, usually requiring the use of the lowest bidder and allocations for minority or small businesses.
- There is a perceived loss of power and authority to those in middle-management.

Shoop concludes, "improving the quality of government services is hardly a national priority on the level of, say, deficit reduction." And yet, perhaps it should be. Some government officials and outside analysts believe cost savings are possible with a comprehensive productivity and quality program, and could cut the deficit and lower taxes. Steve Kelman, professor of public policy at Harvard University's Kennedy School of Government, Cambridge, Massachusetts, estimated a twenty percent improvement in government services could reduce the deficit by about five percent (Eisman, 1990).

In the 1989-90 fiscal year, employee suggestions saved the government $1.2 billion, due in part to the increased use of principles and tactics found in TQM. The government is experimenting with gain sharing, which directs some of the money saved directly into the worker's hands. Unlike awards given as part of an employee suggestion program, gains due to productivity improvements may be shared between the agency and its employees, with each employee receiving the same amount (Eisman 1990). Newt Gingrich (R-GA), the Republican whip, has made Quality Improvement a highly visible part of his platform, proposing an overall gain sharing plan for federal agencies (Penzer 1991).

In March 1992, a bill to establish a National Quality Commitment Award, with the objectives of "encouraging American universities to teach total quality management, to emphasize the importance of process manufacturing, and for other purposes," was introduced before the Committee on Commerce, Science and Technology. The legislation would provide three annual awards to selected universities and colleges that excel in teaching total quality management, which practice total quality management in their internal management, and which employ total quality management in their business relationships with industry. The proposed award amounts are $3 million, $2 million, and $1 million, with specialized awards of up to $500,000. Presently 50 universities in Europe incorporate total quality theory in their general-management curriculum (Congressional Record--Senate, March 26, 1992).

TQM is not well understood, perhaps because Deming put forth his "Profound Knowledge" and Fourteen Points in the form of a philosophy, with a rambling narrative, rather than a concrete list of well-defined steps for achieving quality. And while others have added to his philosophy with specific components, there is no one set of instructions for "doing TQM." In fact, that is the point: TQM is the optimization of a system; therefore, the characteristics of the organizational system will greatly affect how TQM is structured and implemented.

Existing Strategies for the Implementation of TQM in Government Agencies

At present, there are some guidelines, but few models or strategies are available for the implementation of TQM in federal agencies. Ehrenberg and Stupak (1992), state successful implementation of TQM must include:

- Use of quantitative measures to continuously improve processes
- Focus on providing quality services that meet customer defined expectations
- Empowerment of individuals to improve processes and assume accountability for products and services

- Decisions based on fact
- A commitment from top management to change the culture and embrace the TQM philosophy

In *Excellence in Government*, Carr and Littman, (1990) suggest implementation via the "Twin Track" approach. The four phases are:

1. Assessment: Identify the opportunities for quality improvement
2. Planning: Develop a structured program of improvement projects and changes leading to TQM implementation
3. Implementation: Introduce quality practices and their support systems

   Short-term track: pilot projects on critical issues and processes

   Long term track: deployment of TQM throughout an organization
4. Institutionalization: Develop internal capacity to perpetuate TQM

Four different ways Carr and Littman see governments introducing TQM at the agency level are:

- Slow cascading pattern: Top leaders receive training in TQM methods and teach their subordinate managers, who form teams and train their subordinates until everyone is trained.

- All-at-once pattern: Everyone is trained in TQM in a short period of time, form teams and get started. They state this method usually fails because managers do not have time to become skilled in TQM methods before the workers do, and therefore can't give them guidance and direction.

- Spotty pattern: Some people get a little training in the concept and tools, or only workers, not managers, participate, as in the old model of quality circles in the United States. It has few benefits and "always dies."

- "We're doing it already" pattern: The organization simply labels all its current improvement programs "TQM." This occurs often in both industry and government.

They advocate that only the "Slow Cascading" approach has real merit, but state it may take a long time, and therefore be ineffective. Another problem with the slow

cascading approach is the concept of employees training employees. This is contrary to Deming's philosophy in that TQM requires a change in the mind-set, as well as the entire culture of an agency. When in-house training is done by managers, there will be a tendency to retain those power structures which are most difficult for managers to give up. Until the TQM culture has had adequate time to be absorbed into the agency, TQM training should be administered by those outside the agency who have extensive experience or knowledge of TQM.

Joseph Sensenbrenner, former mayor of Madison, Wisconsin was one of the first public officials to adopt TQM on a citywide scale. In his seminar presentation, "How to Apply Deming's Quality Improvement Principles to Public-Sector Services and Administrative Operations," (1992) Sensenbrenner suggests the following master plan for implementation:

- Prepare an Organizational Vision
- Identify Quality Problems Which are Barriers to the Vision
- Gather Other Data Which May Be Important in Formulating the Quality Policy
- Key Leaders Prioritize the Barriers to be Addressed
- Provide Top Management Education
- Confirm the Necessity for TQM
- Determine the Objectives for TQM Introduction
- Prepare TQM Master Plan
- Establish TQM Support Office and Organization
- Prepare an Education and Training Program

The current strategies available to assist in the implementation of TQM in federal agencies are helpful but incomplete. They fall short of providing a full range of specific "activity" oriented strategies or a model for full implementation.

TQM and Organizational Change Theory'

Because TQM calls for a major change in the culture of a federal agency, it is important to understand how organizational change works, and to see if TQM is in alignment with the general guidelines for successful organizational change. Organizational change is a process or strategy which is concerned with how planned change is implemented and specifically where change will lead an organization (Ott, 1989). Implementation of change in any agency must be planned, organization-wide, managed from the top, and must increase organization effectiveness and health through planned intervention in the organization's processes based on behavioral-science knowledge (Beckhard, 1969).

Early change-oriented organizational behavior theory and practice consisted of three processes called the primary intervention tasks: valid information, free choice, and internal commitment (Argyris, 1970). Experiments by Coch and French (1948) concluded interaction of employees and management in planning will reduce the workers' resistance to changes. In order for change to be accomplished, Lewin (1952) concluded change is accomplished by "adding forces in the desired direction, or by diminishing opposing forces." He called for unfreezing, change and refreezing because if only the change process is focused on, the change will not last. Leavitt (1965) called for a humanistic approach to organizational change in the form of power equalization.

Organizational effectiveness is the goal of organizational change. According to Schein (1980), standards for maintaining or increasing organizational effectiveness which would need to be reflected in TQM are: 1) the ability to take in and communicate information reliably and validly, 2) internal flexibility and creativity, and 3) integration and commitment to the multiple goals of the organization. A willingness to change is necessary, and will provide 4) support and freedom from threat, and 5) the ability to continuously redesign the organization's structure to be congruent with its goal and tasks.

Schein's (1985a, 1985b) work in organizational culture argues that organizational culture forms in response to two problems organizations face: a) problems of external adaptation and survival (external environment), and b) problems of internal integration (internal working relationships). He suggests the organizational mechanisms that maintain culture are a) what managers pay attention to, measure and control, b) the way managers react to critical incidents and organizational crisis, c) criteria for allocating rewards and status, and e) criteria for recruitment, selection, promotion, and removal from the organizational.

TQM in the form of quality circles and participatory management began to appear in the early 1980's. At that time, organizational change was viewed as a "long-range effort to improve an organization's problem-solving and renewal processes, particularly through a more effective and collaborative management of organizational culture . . . with the assistance of a change agent, or catalyst, and the use of the theory and technology of applied behavioral science, including action research" (French and Bell, 1984).

Weisbord (1987a, 1988) added to the sub-field of implementation of organizational change theory by developing a "practice" theory which includes a) assess the potential for action, b) get the whole system in the room (high levels of participation are viewed as critical for effective change, c) focus on the future (a "strategic visioning process" in contrast to short-term problem solving), and d) structure systems tasks people can do for themselves. Weisbord's theoretical perspective is "help(ing) people take charge of core business processes--economics and technology--through collaborative organization and design of their own work" (Woodman, 1989).

Deming's philosophy represents a transformational change, a "revolutionary" organizational change, or organizational transformation as described by Tichy and Ulrich, 1984. Those implementing change are expected to accomplish qualitative and quantitative change, which requires the alteration of organizational norms, realities,

beliefs, values and assumptions (Allaire & Firsirotu, 1985; Gemmill & Smith, 1985; Kilmann & Covin, 1988). Organizational norms are violated by creating a new vision of the organization, often based on the conscious manipulation of symbols, and the selling of the new vision to important stakeholders (Ott, 1989).

The implementation of the full spectrum of TQM in federal government requires a drastic shift by both management and workers. TQM is in alignment with organizational change theory, accomplishing an organizational transformation resulting in qualitative change based on Deming's Fourteen Points and philosophy, as well as quantitative change, based on Statistical Process Control and other "tools and techniques." It brings about a change in the organizational culture, including moving from viewing employees as passive cogs, as in Taylorism, to employees who are active and willing accomplices.

TQM specifically deals with both internal and external environments, with a more effective organization as the goal of the change. It is a humanistic approach, with emphasis on cooperation and interaction between employees and management. TQM is a system-wide change in the organization, and calls for going beyond superficial change which leaves the current power structure intact. It is not just the change of employee behavior rules; it is a transformational change in the nature of power and control.

RESEARCH METHODOLOGY

A review of the literature on TQM generates the hypothesis that TQM can be successfully implemented in service organizations such as federal agencies. The particular TQM components used may depend on the characteristics of the organizational system it is being implemented in, and therefore a great deal of variation in the application of the components and in the implementation pathway may exist. Additional variation may exist since TQM is based on a blend or mixture of philosophies, beginning with Deming's Fourteen Points and encompassing Juran, Ishikawa and others.

In *Tinkering with the System,* (Yin et al, 1977) used case studies to "improve federal policy making by increasing our understanding of how state and local services implement and incorporate innovations." The case studies chosen for this analysis, by virtue of their receipt of the Quality Improvement Prototype Award, indicate they have successfully implemented TQM. This study does not seek to validate or invalidate that claim. Nor does it seek to determine whether or not TQM should be implemented in federal agencies. Rather the questions to be answered are:

> What are the components of TQM being implemented by federal agencies which have successfully implemented TQM?
>
> What is the implementation pathway being used by federal agencies which have successfully implemented TQM?

These questions are addressed through the review and analysis of ten case studies prepared by the agencies. While an "n" of ten is small, this represents the total number of QIP award winners for the past three years. Further, these site-specific experiences have not been brought together previously for synthesis and analysis regarding the identification of components of TQM and the implementation pathway used in federal agencies in relationship to organizational change theory.

The information used in this analysis is drawn from case studies authored by the staff of the federal agencies named as QIP award recipients. It is assumed the chronology of reporting follows the chronology of implementation. However, these self portraits may provide a biased picture of the actual TQM experience. Since the full extent and nature of these biases are unknown, the conclusions drawn from these case studies may or may not be directly related to the actual TQM experience. Nonetheless, they are valuable in that they provide a rich range of experiences from which to identify agency staff perceptions of components of TQM and its implementation in federal agencies.

The analysis of the case studies attempts to identify key factors in the TQM experience for each case. The key factors are based on the mention of a key word or phrase in the case study which can be linked with Deming's Fourteen Points or with the path of implementation. The analysis is therefore based on the actual reporting of an event or organizational characteristic by the case study.

This analysis identifies those factors associated with the successful implementation of TQM. Although such associational links are not sufficient grounds for establishing causal relation, the failure to find a consistent link between a group of identified TQM components and the successful outcome would be sufficient grounds for rejecting those TQM components as central in the successful implementation of TQM in federal agencies process.

The traditional voting method as described by Light and Smith (1971) is used as a means of tabulating findings among different research studies. Parenthetical comments have been added for clarification relative to this particular research.

> "Studies which have data on a dependent variable (in this case, implementation of TQM) and a specific independent variable of interest (component of TQM or the TQM implementation pathway) are examined."

> "Three possible outcomes are defined. The relationship between the independent and the dependent variable is either significantly positive (definitely found: 1), significantly negative (definitely not found: -1) or there is no significant relationship in either direction (no reference: 0)." The number of studies falling into each of these three categories, is then simply tallied.

The results reported in each study are taken at face value. Identification of the components of TQM used, and the implementation pathway taken, are correlated in each case for comparison. A matrix is formulated for the TQM components and for the implementation pathway identified in the studies.

FINDINGS

This section of the analysis contains 1) a list of the agencies which were used in the project, 2) identification and description of the components of TQM which were used by the agencies, 3) a point of caution in the interpretation of the findings, 4) identification and description of the steps taken by each agency in the implementation of TQM, and 5) a consolidation and description of the components of the implementation pathways.

Appendix A contains a matrix of the Identification of Components of TQM Relative to Deming's Fourteen Points for each agency. Appendix B contains a summation of the Findings, including a list of agencies, components of TQM, and implementation pathways used as identified in this project.

Figure 1

List of Agencies

The following is a list of the agencies which received the 1990-1992 Quality Improvement Prototype awards used in this study:

Agency #1 (1990)
Cincinnati Service Center
Internal Revenue Service
Department of the Treasury
Covington, KY

Agency #2 (1990)
Defense Industrial Supply Center
Defense Logistics Agency

Agency #3 (1990)
Johnson Space Center
National Aeronautics and
Space Administration
Houston, TX

Agency #4 (1991)
1926th Communications-Computer
Systems Group
Warner Robins Air Logistics Center
Air Force Logistics Command
Department of the Air Force
Robins Air Force Base, GA

Agency #5 (1991)
Sacramento Air Logistics Center
Air Force Logistics Command
Department of the Air Force
Sacramento, CA

Agency #6 (1991)
Aeronautical Systems Division
Wright-Patterson Air Force Base,
OH

Agency #7 (1992)
Defense Contract Management
District Northeast,
Boston, MA

Agency #8 (1992)
U.S. Department of Labor Wage
and Hour Division
San Francisco Region

Agency #9 (1992)
Public Services and Administrative
Patent and Trademark Office
Department of Commerce
Arlington, VA

Agency #10 (1992)
Department of Veterans Affairs
Philadelphia, PA

Components of TQM Used by Federal Agencies

In order to identify which components of TQM were used by the federal agencies, a matrix was created for each agency listing Deming's Fourteen Points (See Figure 2). Components of TQM representative of Deming's Fourteen Points were then identified within the agency case studies (See Appendix A). The "voting method" was applied: for each component definitely found; a 1 was placed in the matrix under that Point. For each component definitely not found; a -1 was placed in the matrix under that Point. If no reference was made to the component, this indicated no significant relationship in either direction as the component may or may not have been used by the agency, but simply not mentioned in the case study; and a 0 was placed in the matrix under that Point. It was then determined from the matrix which components of TQM representative of Deming's Fourteen Points were being implemented in federal agencies according to the case studies.

The following provides a summation of the frequency the components appeared in the agencies, and a brief description of how the Point was carried out by the agencies.

Point 1: Create constancy of purpose

This was mentioned by all agencies. Each agency emphasized top management's realization that a system was needed to pull it all together; the recognition of the need for a culture change, and the ability of TQM to provide the framework that led to the full implementation of TQM.

Point 2: Adopt the new philosophy

This was mentioned by all agencies. Every agency adopted a quality plan with key principles based on Deming's Fourteen Points or Juran's Trilogy. The philosophies included the principles of focusing on achieving customer satisfaction, seeking continuous improvement and full involvement of the entire work force. Often a Quality office or an Assistant to the Administrator position was established. A formal quality structure usually included a Quality Council,

Identification of the Presence of the Components of TQM											
Definitely Found = 1, No Reference = 0, Definitely Not Found = -1											
	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5	Agency 6	Agency 7	Agency 8	Agency 9	Agency 10	TOTALS
Point 1 Create constancy of purpose	1	1	1	1	1	1	1	1	1	1	10
Point 2 Adopt the new philosophy	1	1	1	1	1	1	1	1	1	1	10
Point 3 Cease dependency on mass inspection	1	0	1	0	1	1	0	0	1	1	6
Point 4 Purchase based on quality	0	1	1	0	1	1	0	0	1	0	5
Point 5 Continuous improvement	1	1	1	1	1	1	1	1	1	1	10
Point 6 Modern training	1	1	1	1	0	1	1	1	1	1	9
Point 7 Modern leadership	0	1	0	1	1	1	1	1	1	1	8
Point 8 Drive out fear	0	0	0	1	1	1	1	1	1	0	6
Point 9 Break down barriers	1	1	1	1	1	1	1	1	1	1	10
Point 10 Eliminate slogans	0	0	0	0	0	0	0	0	0	1	1
Point 11 Eliminate quotas	1	0	0	0	0	0	1	1	1	0	4
Point 12 Remove barriers to pride in workmanship	0	0	0	1	1	1	0	0	1	1	5
Point 13 Education and retraining	1	1	1	1	1	1	1	1	1	1	10
Point 14 Create structure to support above	1	1	1	1	1	1	1	1	1	1	10
TOTALS	9	9	9	10	11	12	10	10	13	11	

Figure 2

composed of top management; agencies varied in their use of Quality Committees, Teams, Coordinators, Instructors and Facilitators. Several agencies had outside consultants. One agency had no formal Quality structure other than stating everyone shared in the responsibility for quality.

Point 3: Cease dependency on mass inspection

This was mentioned by six of the ten agencies. Agencies mentioned changing the focus from inspecting the outputs of the process to focusing on the way the work was done; doing it right the first time. Two agencies related instances where an employee exercised the right to stop a process when a job was not meeting their quality standards. Several agencies mentioned the implementation of Statistical Process Control techniques for monitoring the quality of their work.

Point 4: End the practice of awarding business on price tag alone

This was mentioned by five of the ten agencies. Several agencies mentioned the improvement of acquisition procedures, working with suppliers for the delivery of a better product, and measuring key products of suppliers by quality. This was more likely to be mentioned by agencies which were involved in production such as aviation systems or maintenance, but was also mentioned by several service agencies.

Point 5: Constantly and forever improve the system of production and service

This was mentioned by all agencies. The methods mentioned for continuous improvement included references to incrementally improving daily operations, on-going quality planning assessment, and continuous improvement via full empowerment of employees. A change in regulations to accommodate improvement in a process was often required.

Point 6: Institute modern training on the job

This was mentioned by nine of the ten agencies. Although this point addresses training relative to the job, rather than training in TQM, they often became

intertwined. For instance, a process review team would flow-chart a process, determine changes, and retrain employees to accommodate the new process. Technical training was provided for improving procedures; enhanced personal development education and training was also offered.

Point 7: Institute modern methods of supervision

This was mentioned by eight of the ten agencies. Senior and mid-level management were usually the first to receive training in the TQM philosophies and tools such as Statistical Process Control. Team-leader training was offered as a part of TQM, and participatory management was promoted.

Point 8: Drive out fear

This was mentioned by six of the ten agencies. Several agencies reported providing an environment for employees to freely express their ideas, but it went further than having an employee suggestion box. The employee was given permission to tell the truth, to "voice our problems" without fear of repercussions. Management responsibility to the employee for empowerment was sometimes expressed in a Quality Bill of Rights, with the foundation of mutual respect, trust, and shared goals. But it was the employee's ability to invoke the Rights that established the attainment of the goal to drive out fear.

Point 9: Break down barriers between departments

This was mentioned by all agencies. It was most often expressed by the formation of teams, especially cross-functional teams. However, other specific areas mentioned were breaking down communication barriers among employees, ensuring mutual cooperation, coordination and employee participation, sharing the results of accomplishments, and cross-training.

Point 10: Eliminate slogans, exhortations, and numerical targets asking for new levels of productivity without providing methods

This was mentioned by one of the ten agencies. This agency stated they set goals and objectives for the organization, and then worked to ensure they were realized; quality didn't mean exhorting employees to do better or produce error free work, it did mean providing them with the training, tools and techniques for improvement.

Point 11: Eliminate work standards and numerical quotas

This was mentioned by four of the ten agencies. One agency's attitude was "eliminate quotas--what matters is the accuracy of the data." Another agency's goal was to reduce errors: emphasis is on the process used, then achievement of a numerical goal. Development of quality performance measures in lieu of the traditional "numbers" approach to planning, and tracking time frames for complaint response rather than quantify back wages collected were given as examples by an agency.

Point 12: Remove barriers that hinder the worker

This was mentioned by five of the ten agencies. Mechanisms were put in place by which employees could "work smarter" and improve processes. Respect for individuals, and the removal of barriers to achievement of quality were mentioned. Agencies encouraged employee involvement, and enabled employees to have ownership of their own work.

Point 13: Institute a vigorous program of education and training

This was mentioned by all agencies. Education and training had many different components. While many agencies trained all of their employees in basic TQM principles, some agencies were selective of who received the training. Managers often received training in TQM "tools and techniques" (consisting of basic processes such as idea generating techniques, problem and process analysis, creative problem solving), and leadership. Other training and education included assessment and promotion of work force capabilities. Agencies often provided

retraining for employees if a job was eliminated through TQM improvement processes.

Point 14: Create a structure in top management that will push every day on the above 13 points

This was mentioned by all agencies. A primary way for accomplishing this was to provide TQM training to all employees, with senior and mid-level management receiving Statistical Process Control and leadership training. Employee union representation was often included in the TQM process from the very beginning. Employee involvement at all levels, use of an employee survey to determine which areas should be worked on, multi-level involvement on strategic processes, special activities such as Quality Fair and Quality Day, and Quality articles in the agency newsletter were reported by agencies.

Summary of Findings: All components of Deming's Fourteen Points were mentioned in the agency case studies, although not all points were mentioned by all agencies. No agency implemented all fourteen points, however, one agency implemented thirteen points, six agencies implemented ten to twelve points, and the remaining three agencies implemented nine points. Agencies receiving the QIP award in 1990 implemented the lowest number of TQM components. It may be that 1991-1992 QIP award winners who implemented a higher number of TQM components were able to apply knowledge gained from the experience of the earlier winners.

The components which appeared in all ten agencies were:

Point 1: Create constancy of purpose

Point 2: Adopt the new philosophy

Point 5: Continuous improvement

Point 9: Break down barriers

Point 13: Education and retraining

Point 14: Create structure to support above

Components which appeared between 6 and 9 times were:

Point 6: Institute modern training (9)

Point 7: Institute modern leadership (8)

Point 8: Drive out fear (6)

Points 6 and 7 were mentioned by most agencies; it is difficult to know whether these points might have been addressed under Point 13 (education and retraining), and simply not separated out in the case study. Point 8 may also have been addressed, but not specifically mentioned in the report; also, it may be difficult to acknowledge that fear exists in an agency.

Components which appeared least often were:

Point 3: Eliminate slogans (1)

Point 4: Purchase based on quality (5)

Point 11: Eliminate quotas (4)

Point 12: Remove barriers to pride in workmanship (5)

Point 3 was mentioned the least often, perhaps because slogans are used throughout most organizations, even for TQM. Point 3 addresses using slogans without the means to carry them out. Point 4 may have been viewed as difficult to implement because of the difficulty in changing government regulations, even though it was mentioned by half of the agencies. Points 11 and 12 may have been difficult to report because of the difficulty in identifying "quotas" or "barriers," and therefore it may have been addressed in another manner, but not identified with these specific points.

A Point of Caution in the Interpretation of the Findings

A point of caution is advised in the interpretation of the finding of components of TQM being used by the federal agencies. Deming's Fourteen Points can be divided into two categories: 1) points which require an activity to begin (creating constancy, adopting the new philosophy, continuous improvement efforts, instituting on-the-job

training, instituting supervisory training, breaking down barriers between departments, instituting a vigorous program of education and training, and creating a structure in top management that will support the TQM system), and 2) points which require an activity to stop (stopping mass inspection, ending the practice of awarding business on price tag alone, driving out fear, eliminating slogans without methods to achieve goals, eliminating work standards and numerical quotas, and removing barriers that hinder the worker). It may be easier to report when a process is started than to report a process is ended, or never existed in the first place.

Furthermore, although an agency might have mentioned a point in their case study, it is not possible to estimate the extent to which it is carried out, or if it is carried out with the intensity Dr. Deming or Dr. Juran may have intended. For instance, it became a little cloudy when an agency used slogans relative to attaining TQM. The assumption is that the slogan is accompanied by the means to do the job. Also, the case studies reflect the status of TQM at the time of the receipt of the QIP award; activities in the process of being implemented are not included.

Early QIP winners' (1990 & 1991) case studies concentrated more on the agency, its operations, and the outcome of TQM efforts rather than describing specific TQM mechanisms. Therefore, they may have been implementing a specific point, but it was not mentioned; only the resulting success of a project or savings attained was reported.

Implementation Pathways Used by Federal Agencies

Identification of the Steps of Implementation : In order to identify the implementation pathway, the steps taken by each agency for implementation TQM were identified (See Figure 2). These steps were reviewed, and the components of implementation found in each agency were listed. These components were grouped into generalized headings. A matrix was prepared which identified the components used by each agency (See Figure 3). The "voting method" was applied: for each component definitely found, a 1 was placed in the matrix under that Point. For each component definitely not found, a -1 was placed in the matrix under that Point. If no reference was made to the component, this indicated no significant relationship in either direction as the component may or may not have been used by the agency, but simply not mentioned in the case study; and a 0 was placed in the matrix under that Point. It was then determined from the matrix which components of the implementation of TQM were being implemented in federal agencies according to the case studies.

Figure 3

Implementation Steps Taken By Each Agency

Agency #1 (1990)
Cincinnati Service Center, Internal Revenue Service
INDIRECT
Interest in TQM began in the 1980's
Top management ***committed*** to TQM in 1986
Management ***trained*** in TQM over a period of time
Quality ***structure*** in place
All employees receive some TQM ***training***

Agency #2 (1990)
Defense Industrial Supply Center, Defense Logistics Agency
INDIRECT
Interest in TQM began in the early 1980's
Top management recognized the need for their commitment and involvement in 1987
Management decided to ***expand TQM*** to more employee participation
Executive steering committee for TQM ***structure***
Training provided at all levels (Quality Campus)
Task ***teams*** formed for projects

Agency #3 (1990)
Johnson Space Center (NASA)
INDIRECT
Interest in TQM began in the early 1980's; commitment in 1986
Early productivity ***improvement efforts***
Management and workers ***educated*** in TQM over an extended period of time
TQM techniques and ***teams implemented*** in a continuous improvement ***philosophy***

Agency #4 (1991)
1926th Communication-ComputerSystems Group
Warner Robins Air Logistics Center
Air Force Logistics Command
DIRECT
Top management recognized the Quality Revolution
Top management's ***commitment*** to TQM in 1988
Quality Council ***structure***
Training for the entire work force
Total Quality Transformation ***philosophy***
Involvement of every person

Agency #5 (1991)
Sacramento Air Logistics Center
Air Force Logistics Command
DIRECT
Senior leaders realized Command had to be a leader in the quality revolution in 1987
Top management's ***commitment*** through support of time, money and manpower
Developed quality ***philosophy***
Quality ***structure*** developed
Training for employees
Empower work force to fully implement TQM

Agency #6 (1991)
Aeronautical Systems Division
Wright-Patterson Air Force Base, Oh.
INDIRECT/DIRECT COMBINATION
Some senior officials became ***aware*** of TQM; commitment in 1987
A few people received ***training*** in TQM
Pilot program
Training given to more people
More pilot programs
In-house TQM ***trainers*** developed
Training given to more employees
Entire division becomes ***committed*** to TQM

Agency #7 (1992)
Defense Contract Management District Northeast
DIRECT:
Management instituted TQM philosophy in 1987
Established TQM ***structure***
Developed a strategic plan
Realization that all employees must be ***involved*** in TQM
Select groups receive TQM ***training***
Involvement of all

Agency #8 (1992)
U. S. Department of Labor Wage and Hour Division
INDIRECT
Interest in TQM began in the early 1980's
Managers ***trained*** in quality leadership: participatory management, quality circles, teams
Employee ***involvement*** encouraged
Fragmented efforts lead to ***commitment*** to TQM philosophy in 1988
Strategic plan developed for implementation of TQM
TQM ***structure*** developed
All employees received TQM ***training***

Agency #9 (1992)
Public Services and Administration Patent and Trademark Office:
DIRECT:
Top management recognized the need for change
Top management adopted TQM principles in 1989
Identified reasons to change; gathered facts
TQM ***leadership training*** for managers and supervisors
Employees received ***training***
Involvement of managers, supervisors, union reps and all employees

Agency #10 (1992)
Department of Veterans Affairs
DIRECT:
Senior management becomes ***aware*** of TQM philosophy; commitment in 1988
Education of some senior management
Quality Council formed ***(Quality structure)***
Team leader TQM ***training*** by consultant
Teams formed
All employees ***trained*** in TQM
All employee ***involvement*** in ***team*** processes

Consolidation of the Steps of Implementation

The following is a consolidation of the keys words found in the identification of the steps taken by each agency, followed by a brief description of how the steps were carried out by the agencies.

Recognition: Recognition of TQM as a viable management philosophy for improving the agency

Commitment: Commitment by top management to the TQM philosophy

Structure: Creation of a TQM organizational structure

Philosophy: Adoption of a TQM philosophy

Training: Training for the remainder of the work force

Involvement: Involvement of all employees in total quality management at all levels of the organization

Time: The time element within which TQM was implemented. This is broken down into three sub-categories:

> **Direct**: Top management is wholly committed to TQM, with implementation directed at the entire agency.
>
> **Indirect**: Interest in TQM by management, but only fragmented components of TQM implemented over a period of time. Management then recognizes the potential and makes a firm commitment to the TQM philosophy.
>
> **Combination**: Top management is aware of TQM, uses small pilot projects for 1-2 years, then commits the entire agency to TQM.

Identification of the TQM Implementation Pathway											
Definitely Found = 1, No Reference = 0, Definitely Not Found = -1											
	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5	Agency 6	Agency 7	Agency 8	Agency 9	Agency 10	Totals
Component 1 RECOGNITION	1	1	1	1	1	1	1	1	1	1	10
Component 2 COMMITMENT	1	1	1	1	1	1	1	1	1	1	10
Component 3 STRUCTURE	1	1	1	1	1	1	1	1	1	1	10
Component 4 PHILOSOPHY	1	1	1	1	1	1	1	1	1	1	10
Component 5 TRAINING	1	1	1	1	1	1	1	1	1	1	10
Component 6 INVOLVEMENT	1	1	1	1	1	1	1	1	1	1	10
Component 7 TIME: DIRECT	0	0	0	1	1	0	1	0	1	1	5
Component 8 TIME: INDIRECT	1	1	1	0	0	0	0	1	0	0	4
Component 9 TIME: COMBINATION	0	0	0	0	0	1	0	0	0	0	1
Totals	7	7	7	7	7	7	7	7	7	7	

Figure 4

Components of the Implementation Pathway Findings

Recognition: Several agencies had been implementing various components of TQM relative to quality since the early 1980's. These components included productivity improvement efforts such as participatory management, quality circles and teamwork. Several years after first beginning to use various components of TQM, a recognition took place where TQM came to be viewed as a method for providing a framework for pulling separate quality management strategies together. Agencies acknowledged "bottom-up" methods such as quality circles were able to achieve only limited improvement, and real success was possible only when the quality effort was planned and driven from the top.

In agencies where TQM was implemented via the direct route, top management became aware of the philosophy of TQM and the potential for improvement in their agencies. They attended seminars or training on TQM, which led to the recognition that TQM provides the systematic approach needed for improvement in the agency.

Commitment: All agencies emphasized the importance of commitment to TQM from the top-down, with management demonstrating commitment by supporting TQM processes with the resources of time, money and personnel necessary to carry them out. Several agencies mentioned that in order to effect the change in culture that TQM brings about, a commitment of five to seven years is required. They also mentioned the process is not without frustration, and that patience is of paramount importance.

Structure: The Quality Structure used for the implementation of TQM varied from making everyone responsible for TQM, to having a TQM office with several staff and an Assistant to the Administrator/Commander for Quality. All agencies but one had a Quality Council. That agency had interlocking natural teams consisting of managers and staff. Many had sub-councils, teams, and sub-teams.

Philosophy: The majority of the agencies used a custom blend of philosophies, with several using Juran or Deming exclusively. Agencies defined the specific principles

they were using, and many developed a strategic plan with steps based on TQM processes. These carried various names, such as, Structure for Success, TEAMWork (Together Employees and Managers Work), and Quality Culture. Many developed extensive Vision Statements, Mission Statements, and Objectives.

Training: Many of the agencies proudly declared all of their employees have received TQM training. Some agencies who implemented TQM in an Indirect manner did not train all of their employees. Top and mid-level management and supervisors received TQM training, and employees received training if they were going to work on teams. In agencies which implemented TQM in a Direct manner, the top and mid-level management and supervisors received TQM training, then the remainder of the employees received training. Several agencies used outside consultants for the initial training, then trained employees as trainers or coordinators and facilitators within teams. One agency sent management to TQM training, and then management conducted the in-house training.

Involvement: The goal for agencies who implemented in a Direct manner was to involve all employees in problem solving and methods development. In an Indirect agency which had been phasing in TQM since the 1980's, only one-third of the employees had been involved in quality processes. Several agencies stressed the importance of involvement of everyone: managers, supervisors, union representatives and all employees. For one agency, involvement meant every person using statistical process control, every process in control, every worker empowered and participating in continuous improvement, every manager a Quality leader, and all customers visibly satisfied with the service they receive.

Time: The element of time in implementation provided the greatest variance. It was almost evenly split, with five agencies implementing TQM throughout the entire agency (Direct), four agencies phasing in TQM slowly over a number of years (Indirect), and

one agency beginning with pilot programs for 18 months, then directly implementing TQM (Combination).

Summary of Findings: All of the above components were identified in the implementation of TQM in all agencies. The major variance was relative to the time element for implementing TQM within an agency, identified as Direct, Indirect and Combination. There was little variance detected in chronology, with the exception being Structure and Philosophy, which were sometimes reversed, or appeared simultaneously. The three 1990 winners used the Indirect Pathway exclusively, with one 1991 winner using Indirect, one 1992 winner using Combination, and the remaining five using the Direct pathway.

TQM IMPLEMENTATION MODEL

Two pathways for implementing TQM in federal agencies are identified in the TQM Implementation Model: Indirect Pathway and Direct Pathway (see Figure 5). The model is based on a synthesis of the information obtained from the analysis of the case studies of the Federal Quality Institute's Quality Improvement Prototype award winners for 1990-1992 and the current literature on TQM. The purpose is to present a framework for use by federal agencies for the implementation of TQM. This model reflects two scenarios. In the first, TQM is implemented, with a variety of TQM components used independently, but not as a part of a formal TQM structure. In the second TQM is implemented by senior management in a formal structure.

The Indirect Pathway

The Indirect Pathway may begin as a grass-roots effort by individual section chiefs who integrate TQM into their immediate areas. The difficulty is that TQM is the optimization of the entire system, and the section chief has influence in only a small portion of the whole. According to Sensenbrenner (1992a), this model is the one seen in many agencies with lower levels of management attempting to bring about an interest in TQM by senior management. Whether or not this will lead into the Direct Pathway depends on whether senior management becomes aware of the potential for TQM and is willing to make the commitment to the transformational change in the organizational culture required for the implementation of TQM within their agency.

In the TQM Implementation Model, the Indirect Pathway consists of: ***Recognition by a few***, ***TQM Training for a few***, and ***Commitment by a few***. ***A few teams form a few pilot projects***. The ***pilot projects fizzle due to the lack of a TQM framework*** to support them, and ***TQM*** becomes ***"Just another fad."***

TQM Implementation Model

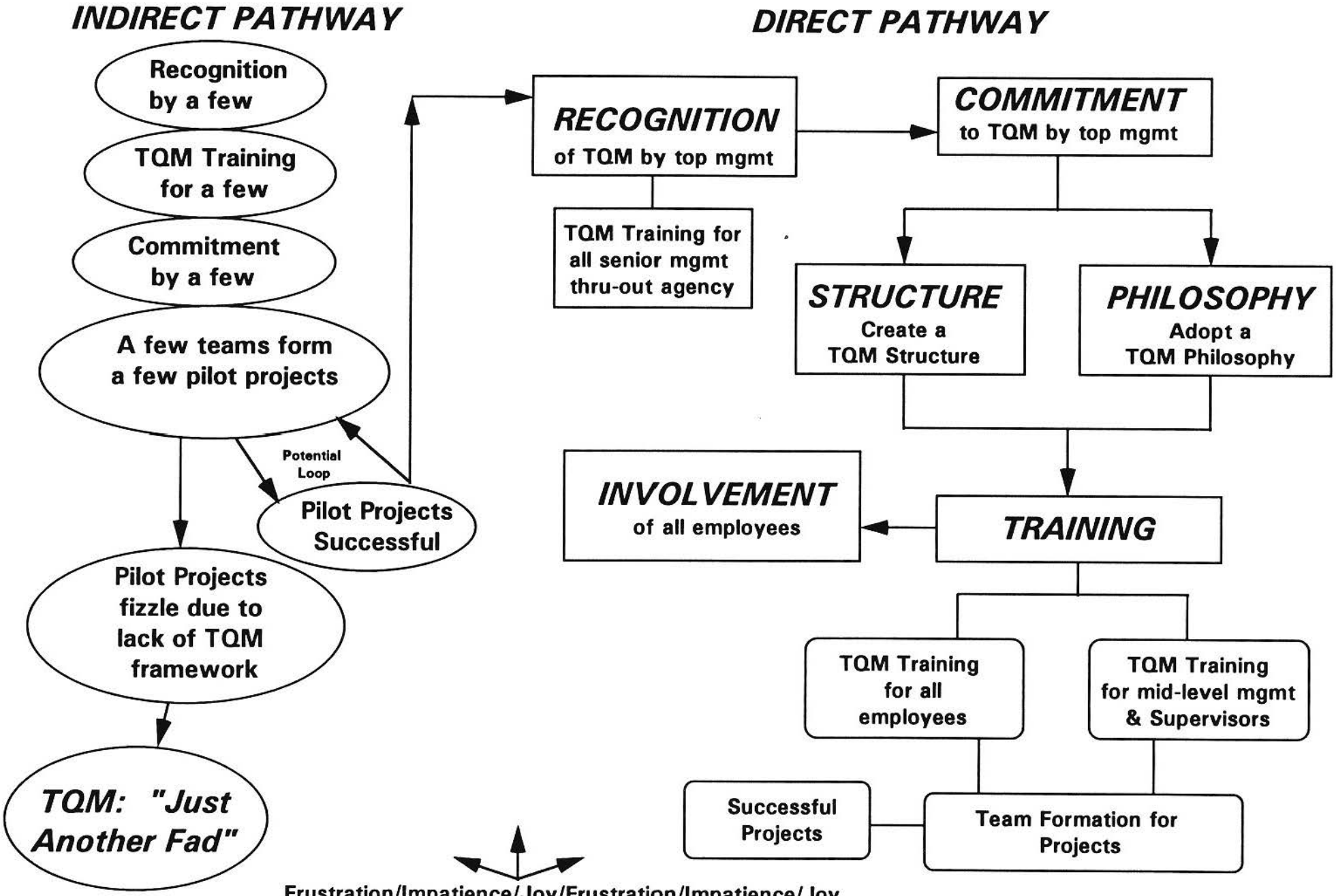

Figure 5

However, senior management may recognize the value and need for TQM based on the success of the pilot projects. In this case, the Indirect Pathway flows into the Direct Pathway. This appears to be the path taken by those agencies studied which implemented individual components of TQM in the early 1980's, and then adopted the TQM structure throughout the agency more recently. Agencies fully implementing TQM from the beginning use the Direct Pathway.

The Direct Pathway

In the Direct Pathway, senior management implements TQM in a formal structure throughout the agency. The components of the Direct Pathway are ***Recognition, Commitment, Structure, Philosophy, Training,*** and ***Involvement.***

The recommended pathway for the implementation of TQM is as follows:

Recognition: Senior management recognizes TQM as the framework for a total approach to quality management. TQM training for all senior management throughout the agency is the beginning point for optimization of the system, the transformational change in the organizational culture called for in TQM. This gives senior management a basic understanding of the principles of TQM, and of what they must do to implement it.

Commitment: Management must demonstrate their commitment by supporting TQM processes with the resources of time, money and personnel. Often referred to as "walking the talk," it also denotes acceptance of the fact that implementation of TQM will take five to seven years. Committing to TQM is a long-term, continuous process; frustration and impatience, as well as joy, will be experienced as the new structure slowly replaces the old.

Where applicable, employee unions should be brought into the early planning stages of the implementation of TQM, and union officials or representatives should attend TQM training sessions. Union involvement and cooperation from the very

beginning are key elements to the successful implementation of TQM. As TQM activities evolve, management should maintain open communication and consultation with union officials. Eventually, trust will be established, and union and management will be able to work together towards mutual goals.

The vision, objectives and philosophies, as well as the barriers, can be explored for development during this time. Identification of the motivation for the implementation of TQM is necessary, followed by confirmation that TQM is the means to address the motivational factors. Motivation may include recognition of the opportunity for overall improvement of the agency, or the assignment of an enormous task which calls for a new way of thinking.

TQM should not be adopted as a method of implementing large reductions in staff due to major budget reductions. This will doom TQM as a viable quality management structure. Employees will not willingly participate in techniques which call for the termination of their own jobs. If elimination of jobs is deemed to be in the best interests of quality, TQM calls for retraining employees whose positions are eliminated and placement elsewhere in the organization.

Structure: The implementation of TQM is best served by a formal management support structure responsible for the implementation of TQM. A Quality Council, composed of senior management, is the form most often found in federal agencies, sometimes with sub-councils, team councils and sub-team councils. A TQM office with an administrator can be supplemented by an outside source, particularly for training purposes. Until TQM has become a part of the agency culture, there is a tendency to fall back to old patterns based on a life-time of habits foreign to TQM. As TQM becomes a part of the agency culture, in-house trainers and facilitators can replace an outside source.

Philosophy: A master or strategic plan which provides the means for achieving TQM is necessary. This will include the vision and the objectives to be obtained through the

implementation of TQM, the timetable, and the measurements to be used. Often a custom blend of TQM philosophies is adopted based on Deming and Juran. There is a danger an agency may simply adopt Deming's Fourteen Points in a mechanistic manner, rather than viewing the process as optimization of the system as a whole. This will not achieve the desired results.

Training: All top-level management must personally attend TQM training at the beginning of the TQM process; this cannot be delegated out. Once top-level management has received training, mid-level management and supervisory training can begin. Training should include basic TQM principles, "tools and techniques," statistical process control (SPC), and leadership training. A combination of basic principles and "tools and techniques" training is then extended to all employees over a period of time. Teams can be formed to work on projects. Once a project is completed, the team is dismantled, and individuals are assigned to new team projects as the need arises.

Deming philosophy is opposed to managers within an agency who have just received TQM training administering TQM training to other employees. It is best to use outside consultants, or TQM specialists hired specifically for the position. Because TQM philosophy brings about a change in the mind-set, most managers will find it difficult to recognize when they are using the old mind-set to apply TQM techniques until they have been immersed in it for a period of several years. The danger is that a "partial" TQM philosophy may be implemented, with managers retaining those portions of the power-base they are least willing to shed.

Involvement: The degree of involvement may vary, but ultimate optimization of the system might consists of: every employee trained and applying TQM in their daily processes, with every process undergoing continuous improvement, every manager providing quality leadership, suppliers providing quality products, and customers visibly satisfied with the service they receive.

Summary: Implementation of TQM via the Direct Pathway is the eventual goal for federal agencies. Until senior management recognizes and commits to the implementation of TQM, it will not be fully successful. The Indirect Pathway provides a means for presenting evidence of the potential of TQM. Individuals within an agency who recognize they are in the Indirect Pathway must work towards the Direct Pathway. This entails getting senior management's recognition and commitment, not simply getting caught up in the loop of forming successful pilot projects. Simply doing more pilot projects without piquing the interest and awareness of senior management will not bring about the successful implementation of the full framework of TQM.

For those agencies intending to fully implement TQM from the beginning, the Direct Pathway provides a basic framework for beginning the process. However, it still requires that the agency create its own specific blueprint according to agency structure and needs. TQM is an evolving process of continuous improvement, beginning with management recognition and commitment to being responsible for the system within which the employees work. Once a structure and philosophy are in place, management then begins training for mid-level management and supervisors, followed by training for all remaining employees. Team formation begins as individuals complete their training, then projects are begun. As described by Deming, frustration and impatience are coupled with "joy." Management and employees work with techniques aimed at optimization of the whole system, finally resulting in involvement of all employees and the successful implementation of TQM.

CONCLUSION

This analysis demonstrates that orthodox TQM can be implemented in federal government agencies, and that as a transformational change, TQM is congruent with organizational change theory. By identifying the components of TQM which are being implemented in federal agencies, and the implementation pathways used, a link is provided between theory and practice.

This study also contributes to the body of knowledge in the sub-field of organizational change implementation theory, by providing specific information on the "practice" of carrying out effective planned change. All of Deming's Fourteen Points were identified as being implemented in the federal agencies studied, two implementation pathways were identified, and a TQM Implementation Model was developed.

TQM is representative of the shift from the hierarchy of Taylorism towards the humanist concepts of Maslow and McGregor. In coupling management and employees in the process of TQM, this follows the trend which is emerging whereby the swing is away from a focus on individual leaders, and towards the concept of leadership as a shared process embedded in social systems (Burns, 1978; Crounch & Yetton, 1988; Dachler, 1984; Hosking & Morley, 1988, in Yukl, 1989).

The humanistic behavior portions of Deming's philosophy and Fourteen Points are not new to organizational change theory. By developing human potential and activating higher-order needs in the service of the organization, this repeats earlier humanist concern for quality of work life and supportive relationships (Yukl, 1989). The empowerment of subordinates and development of a sense of ownership for what goes on in the organization also echoes the emphasis on power sharing, mutual trust and participative decision making advocated by Argyris (1964), McGregor (1960), and Likert (1967). This is combined with the quantitative base of Statistical Process

Control (SPC) in the pursuit of quality to synthesize a management system which provides for optimization of the system for both management and employees.

It is the intensity with which the implementation of TQM mirrors the philosophy of Deming's optimization of the system, not simply the mechanistic deployment of Deming's Fourteen Points, that will bring about the culture change called for in TQM. However, culture lies in deep-seated values and beliefs, and "change levers" are not readily accessible (Fitzgerald, 1988). Competition is deeply ingrained in our society; teams compete against teams at every level. This was reflected by the agency which stated in their case study, "Competition for quality awards strengthens self-assessment and team spirit." This agency is still caught up in the dimension of competition that Deming says must be eliminated. However, as long as they apply continuous improvement to their development of TQM, as well as to the improvement of their product or service, cooperation will eventually emerge.

Although it is an elusive goal, Deming's philosophy and Fourteen Points in the form of Total Quality Management, are akin to a large scale social change movement within an organizational setting. Transition to a TQM culture is not made in one quantum leap whereby all the old values and methodologies are left behind. Implementation of TQM calls for transformational changes in the bureaucracy. Some of Deming's Fourteen Points are the antithesis of the present form of government and therefor there are many barriers to implementation. But, TQM provides a framework for improving quality within the federal system, and orthodox TQM is being implemented in federal agencies.

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency:Cincinnati Service Center, I.R.S. Dept of the Treasury	**Location and Description of Activity AGENCY #1**
Point 1 Create constancy of purpose	iii Develop Quality from the top down, p 5 Top leaders involve quality at meetings, gatherings, conferences, "Through these doors come quality people who do quality work" on doorway
Point 2 Adopt the new philosophy	p 3 "Quality is first among equals with schedule and cost, p6 TQM is a total integrated organizational approach..., p 9 TQM begins with management, p5 Look at "how many good" not "how many" iii/Concepts: Juran:put quality first, eliminate systemic flaws,
	respond to customers needs, install a Quality Improvement Process, Develop evaluating systems consistent with quality principles
Point 3 Cease dependency on mass inspection	Performance indicators to evaluate the quality of work in process
Point 4 End practice of awarding business on price tag alone	Not mentioned
Point 5 Constantly and forever improve the system of production and service	p 8 "Quality is continuous improvement, not acceptable error rates." p9 Making significant process changes in 2 or 3 new areas each year, p 10 Performance indicators to evaluate the quality of work in process
Point 6 Institute modern training on the job	p 3 Training new employees to do it RIGHT the first time, p 12 PC training on-the-job instituted
Point 7 Institute modern methods of supervision	Not mentioned
Point 8 Drive out fear.	Not mentioned
Point 9 Break down barriers between departments	p 11 Joint teams
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels	No mentioned
Point 11 Eliminate work standards and numerical quotas	p 3 Production allowed to grow as employee gains expertise
Point 12 Remove barriers that hinder the ....worker	Not mentioned
Point 13 Institute a vigorous program of education and training.	p 4 All employees receive training
Point 14 Create a structure in top management that will push every day on the above 13 points.	p 4 All employees receive training, p 7 QIP Day, p 4 Union involvement.

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency: Defense Industrial Supply Center	**Location and Description of Activity AGENCY #2**
Point 1 Create constancy of purpose	p iii succ w/q circles, realize wasn't enough-mgmt had to take resp for q if to achieve sig process improvmnts; p 3 top mgmnt commit & involvemt needed to ach improved breakthroughs; 4 long-term goal of bec'g hi-q, cost-conscious ctr that tk care of its
	people and provides responsive & efficient svc to its customers
Point 2 Adopt the new philosophy	p iii established a 3-part command goal/Quality Mgmt Council formed to plan strategies/ p 3 Focused efforts in total emp involv, q imprvmnt plan'g, training, performance, recognition, ; p 3 TQM Council as exec. steering committee
Point 3 Cease dependency on mass inspection	Not mentioned
Point 4 End practice of awarding business on price tag alone	p4 Frzg/testing inventory, writing new & tougher contract provisions, alert'g custs of probs & actions being taken, devel'g new methods of buying items, pursuing civil & criminal actions against contractors wh warrented--via FAST Team; acquisition mgmnt
Point 5 Constantly and forever improve the system of production and service	p 5, 12"continuous improvement: constantly looking for ways to make things better; make continuous improvement a cultural norm; not simply working with the acquisition process but working to improve it.
Point 6 Institute modern training on the job	p 6 Training: Effective Listening; Customer-Vendor, Interpersonal Skills, etc courses
Point 7 Institute modern methods of supervision	p iii Mgrs to Deming Seminar and SPC, p 3 Commander personally conducts numerous sessions of a 2-year merit promotion training course for all mgrs.
Point 8 Drive out fear.	Not specifically mentioned
Point 9 Break down barriers between departments	p iii p 3 Task teams
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels	Not mentioned
Point 11 Eliminate work standards and numerical quotas	Not mentioned
Point 12 Remove barriers that hinder the ....worker	Not mentioned
Point 13 Institute a vigorous program of education and training.	p iii5, 6 Quality College for all employees:team bldg, cust focus, process improvement tools, ldrship skills, training provides the basic tools and skills needed to allow an org to manage quality effectively. Intensive/requires commitment at every level.
Point 14 Create a structure in top management that will push every day on the above 13 points.	Real success is possible when the quality effort is planned and driven from the top: extensive training through quality college for all employees.

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency: Johnson Space Center-NASA	**Location and Description of Activity** **AGENCY #3**
Point 1 Create constancy of purpose	p 5 Management recognized need for change in thinking about improvement, p 13 Evolved from productivity emphasis in '83 to strategic planning, Team Excellence projects and culture survey process 86 to TQM in 1989
Point 2 Adopt the new philosophy	iii Most important resource is its people; broad participation on all levels, commit to change throughout t org, ident'g what changes had to be made and continuous improvement effort
Point 3 Cease dependency on mass inspection	p 10 Formation of Measurement Working group
Point 4 End practice of awarding business on price tag alone	p 13 Project to improve small purchases procedures (general reference to; no specifics given) iii supply returns cut 75%
Point 5 Constantly and forever improve the system of production and service	iii,cont imp approach based on key TQM principles
Point 6 Institute modern training on the job	p 10 formation of the Training Working Group
Point 7 Institute modern methods of supervision	Not mentioned
Point 8 Drive out fear.	Not mentioned
Point 9 Break down barriers between departments	p 6 Team mix to involve all functions, p 12 Teams include contractors
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels of productivity without providing methods.	Not mentioned
Point 11 Eliminate work standards and numerical quotas	Not mentioned
Point 12 Remove barriers that hinder the ....worker	Not mentioned
Point 13 Institute a vigorous program of education and training.	TQM training not supplied to everyone. Available upon request, workshops being systematically developed
Point 14 Create a structure in top management that will push every day on the above 13 points.	p 8 Employee survey to determine areas to work on, p 14 Employee envolvement at all levels, p 7 mu level involvement in strategic processes, p 10 formation of employee involvement working group

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency: 1926th Communications-Computer Systems Group; Warner Robins Air Logistics Center, Air Force Logistics Command	**Location and Description of Activity** **AGENCY #4**
Point 1 Create constancy of purpose	piii "To not see the need is shortsightedness; To see the need and not act is carelessness; To act w/o knowledge is misdirection; To see, know, & act is leadership" from Top Mgmnt Commitment to TQM speech; p3 senior cililian exec: enc'd WR-ALC ldrship
	to embrace TQM calling it "the greatest advancement in theory and tools of management since the Industrial Revolution." "Management theory has caught up with technological advancement" p 5 top mgmt rec's value of TQM methodology/committed to maintn'g
	customer support in the face of dwindling resources. p 20 "top-level TQM support is essential"
Point 2 Adopt the new philosophy	p 3/iii Transformation Triad: Mgnt: functional mgrs into process mgrs& Q ldrs; Methodology: use of SPC and other analytical techniques: People; transformation of the work force into an empowered team perf'g at its full potential. Dev'mt of 14-stp plan
Point 3 Cease dependency on mass inspection	Not mentioned
Point 4 End practice of awarding business on price tag alone	Not mentioned
Point 5 Constantly and forever improve the system of production and service	p 4 Quality methodology itself must undergo cont imp. p 6 constant goal of cont process improvem. p 11 Quality Reviews by commanders; evaluate the health of the org's Q processes; ldrsp, use of methodology, people empowermet, recogition, cust support
	p 21 The aim is always to improve the process, not to fix problems
Point 6 Institute modern training on the job	p4 Continuous improvement through 14-step sequence of improvement actions: range from flowcharting to process certification/Two goals constant: cont process improvement and incr'g customer satisfaction. p 19 imprv'g professional skills of wk fc essential
	p 17 Air Traffic Control trainees get precertification phase; training prior to on-the-job for increased capability/ decrease in certifi time
Point 7 Institute modern methods of supervision	p 19 Improving prof skills of wk force and inserting advanced techology into our processes two essential elements of the Q transformation p 20 Consistency of ldrshp efforts using a highly structured approach is the best way to move the organization frwrd
Point 8 Drive out fear.	p 13 People Empowerment: comp training incl empowerment philosophy & techniques; removing layers of supervision, team bldg course, self-mg'g teams, inv more wkrs in plan'g & goal set'g,
Point 9 Break down barriers between departments	p 4 uses process action teams to analyze and improve the flow of work. Teams made up of workers, suppliers, and customers who contribute their expertise to cvr scope of the process from supplier input to customer use. p 8Removal of functional barriers;
	p 8organized workers around the processes they support; base-level support systems under 5 separate divisions: now all under one process; made for flatter organization, reduced nbr of supervisors: strong emergence of self-managing teams.
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels of productivity without providing methods.	Not mentioned
Point 11 Eliminate work standards and numerical quotas	Not mentioned
Point 12 Remove barriers that hinder the ....worker	p 7Process crosses organization or functional lines; owner (e.g., computer operations process) has the auth and resp to assure the best flow of work across the total process, p 8 Q Bill of Rights: empowerment charter: mutual respect trust/shared goals
	p 13 People Empowerment: comp training incl empowerment philosophy & techniques; removing layers of supervision, team bldg course, self-mg'g teams, inv more wkrs in plan'g & goal set'g, p 21 there must be a relentless puruit of Q transformation
Point 13 Institute a vigorous program of education and training.	p 4 Recognition well-trained work force critical to quality perf and cust satis. Spec TQM trng for all workers, Comprehensive trn'g reflects commitmnt to provide 40 hrs q trn'g in top-dn fashion to mgrs, sups, key pers and entire wk force.
Point 14 Create a structure in top management that will push every day on the above 13 points.	p 22 continue to evolve as a TQM org; refine our q transformation strategy, improve processes using 14-step approach and further streamline the org;

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency: Sacramento Air Logistics Center, Air Force Logistics Command	**Location and Description of Activity** **AGENCY #5**
Point 1 Create constancy of purpose	p 3 Sr ldrs realized Command had to be a leader in the quality revolution p 18 Management must be prepared to demonstrate their commitment by supporting ideas with resources nec to carry them out: time, money and manpower
Point 2 Adopt the new philosophy	p 3 Elements: mgnt commitment, empl awareness/part, continuous process improvement, customer satisfaction p 18 in order to fully implement TQM must have an empowered work force; w/motivation an authority to make decisions w/i their area of expertise
Point 3 Cease dependency on mass inspection	p 3 "inspecting in quality" is simply too expensive and doesn't yield the results we must have.
Point 4 End practice of awarding business on price tag alone	p 13 Procedures for processing purchase requests and following up on contract deliveries revised; additional training for contract administrators provided. p 15 Blue Ribbon Contractor Program: CO authority to exercize their professional judgement in
	awarding spares contracts that have historically been awarded on the basis of price alone
Point 5 Constantly and forever improve the system of production and service	p 3 Improving quality through involving people in continuous process improvement and enhanced product reliability and maintainability, resulting in increased performance of our process and products
Point 6 Institute modern training on the job	Not mentioned
Point 7 Institute modern methods of supervision	p 6 Supervisors' Code of Professionalism: accepting the resp and practicing the behaviors outlined in the code, sup can encourage an atmosphere of mutual trust and respect with their empl's
Point 8 Drive out fear.	p 6 Quality Bill of Rights; supports the creation of an environment of trust throughout the work force; encourages ea mbr to initiate responsible action that will contribute to safety, quality and productivity; ca challenge business as usual, right to be
	heard, right to expect commitment to quality, right to place quality before production, right to feel genuine pride in AFLC products and services
Point 9 Break down barriers between departments	p ii Teambuilding training p 7 Most fundamental tool for process improvement is teams; crosses functiona lines. p 8 teambuilding;
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels of productivity without providing methods.	Not mentioned
Point 11 Eliminate work standards and numerical quotas	Not mentioned
Point 12 Remove barriers that hinder the ....worker	p 15 Quality Bill of Rights
Point 13 Institute a vigorous program of education and training.	p ii,5 Comprehensive education/train'g stragegy, specific process impr tools Exposing the entire work force to the philosophy of TQM/providing them with skills nec to impr processes
Point 14 Create a structure in top management that will push every day on the above 13 points.	p 18 "Partners in Excellence" vision as foundation for quality efforts; integrating specific goals, objectives and strategies related to quality in the SALC Strategic Plan; education/training/teambldg

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency: Aeronautical Systems Division Wright-Patterson Air Force Base, OH	**Location and Description of Activity AGENCY #6**
Point 1 Create constancy of purpose	p 8 Quality Culture: Customer satisfaction first priority
Point 2 Adopt the new philosophy	p 5 Quality Culture: TQ office formed, Continuous improvement/involvement/measurement/do it right the first time/conform to requirements/prevention/customer-supplier relationship
Point 3 Cease dependency on mass inspection	p 14 lab technicians can stop any job that doesn't meet their quality standards, eliminated the need for full-time inspector. Q. IPET: Q. I. Process Evaluation Technique for measuring TQ cultural transformations
Point 4 End practice of awarding business on price tag alone	p 10 Acquisition improvement,
Point 5 Constantly and forever improve the system of production and service	p 9 Search for Opportunities, p 9 ASD objectives, p 12 External focus, TQ Awareness: customer/supplier partnership, contract strategy, product process improvement, product quality
Point 6 Institute modern training on the job	p 9 enhanced personal education and training
Point 7 Institute modern methods of supervision	p 5 Workshops, p 11 Training, p 14 Promoting participatory management
Point 8 Drive out fear.	p 2 Simplify processes to implement ideas, p 7 Feel free to surface their ideas, p 10 Improve work environment, "ASD tomorrow"
Point 9 Break down barriers between departments	p 8 TQ Teams: Responsible to the org directors for TQ implementation, Critical process teams: evaluate key processes which impact several orgs, have critical impact on customers, or provide opp for improvement, p 11 Cross-sectional teams
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels of productivity without providing methods.	Not mentioned
Point 11 Eliminate work standards and numerical quotas	Not mentioned
Point 12 Remove barriers that hinder the ....worker	p 9 SFO Search for Opportunities: work smarter, improve processes and customer support, infuse SFO into thought processes. p 11 Awards: rewards for TQ behavior: teamwork, prevention, customer interface, etc.
Point 13 Institute a vigorous program of education and training.	p 11 Training for nearly everyone ($4 million) P 14 Quality inspector reassigned to a value-added position in the workforce
Point 14 Create a structure in top management that will push every day on the above 13 points.	p 2 Nearly everyone trained in TQM.,

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency: Defense Contract Management District Northeast	**Location and Description of Activity** **AGENCY #7**
Point 1 Create constancy of purpose	p 1 Change from within: culture and organizational change; p 7 development of long and short-term priorities/strategies, p 8 Top mgmt must practice TQM, p 8 Investment in training and tools for employee: p 13 TQM office established
Point 2 Adopt the new philosophy	P(above and)8 Everyone involved in teams, p 11 Customer focus, p 9 provide mgmnt commitment, involv all employees, encourage open communication, contin. improve processes, measure the results
Point 3 Cease dependency on mass inspection	Not mentioned
Point 4 End practice of awarding business on price tag alone	Not mentioned
Point 5 Constantly and forever improve the system of production and service	p 3 Process improvement, "Don't let gov regs get in the way.", p8 Continuous process of strategic, p 9 continuously improve processes, p 12 Improved Contract Database
Point 6 Institute modern training on the job	p 19 Created a training package to address incorrectly done work
Point 7 Institute modern methods of supervision	p 7 Sr and Mid level mgmt trained in SPC/Statistical Process Control
Point 8 Drive out fear.	p 1 Environment for employees to freely express their ideas, p 15 "We can now voice our problems" p 8 "drive out fear."
Point 9 Break down barriers between departments	p 5 Breaking down communication barriers among employees, p 6 cross functional teams, p 13 Foster teamwork, p 13 ensure mutual cooperation, coordination and employee participation, p 15 cross function teams
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels of productivity without providing methods.	Not mentioned
Point 11 Eliminate work standards and numerical quotas	p 18 Eliminate quotas - what matters is the accuracy of the data
Point 12 Remove barriers that hinder the ....worker	Not mentioned
Point 13 Institute a vigorous program of education and training.	p 13 Assess and promote work force capabilities, p 21 Everyone who lost their job was offered a job elsewhere
Point 14 Create a structure in top management that will push every day on the above 13 points.	p 2, 10 all employees engaged in TQM, p 7 Senior and mid level management trained in SPC Statistical Process Control, p 11 employee union representation in TQ process

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency: U.S. Dept of Labor Wage & Hour Division, S.F. Region	**Location and Description of Activity AGENCY #8**
Point 1 Create constancy of purpose	p 1 Diminishing resources, expanding constituency, multiple tiers of review and action on cases; backlogs and ultimate gridlock; Through organizational reflections, determined to set a new course, lead to commitment to quality
Point 2 Adopt the new philosophy	p Customer focus, p 6 Leadership not from rank, but at all levels (each employee empowered to influence processes), interlocking teams, p 7 Quality Model, customer focus/processes/maintain performance/Q ldrsp aimed at mission, vision, values, focus,
Point 3 Cease dependency on mass inspection	Not mentioned
Point 4 End practice of awarding business on price tag alone	Not mentioned
Point 5 Constantly and forever improve the system of production and service	p 5 Continuous improvement of processes, p 7 Continuous improvement via full empowerment of employees, p 8 10-step Improvement Process
Point 6 Institute modern training on the job	Addressed in general within team situations: new ways of doing procedures
Point 7 Institute modern methods of supervision	p 1 Trained supervisors in Quality leadership
Point 8 Drive out fear.	p 10 Employee empowerment, p 11 Self-manging teams
Point 9 Break down barriers between departments	p 11 Cross-runctional teams
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels of productivity without providing methods.	Not mentioned
Point 11 Eliminate work standards and numerical quotas	p 16 Developing quality performance measures in lieu of traditional "numbers" approach to planning, p 18 Tracking timeframes for complaint response rather than quantifying back wages collected
Point 12 Remove barriers that hinder the ....worker	Not mentioned
Point 13 Institute a vigorous program of education and training.	p 19 TQM training
Point 14 Create a structure in top management that will push every day on the above 13 points.	p 6 Involve everyone in management processes, p 19 TQM training for all

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency: Public Services Administration Patent and Trademark Office, Depart of Commerce, Arlington VA	**Location and Description of Activity** **AGENCY #9**
Point 1 Create constancy of purpose	p 7 Change in organizational culture/ p 1 TEAMWORK Together Employees and Managers WORK/ p 1 No separate TQ office; everyone shares the responsibility
Point 2 Adopt the new philosophy	p 2 Educ everyone/ p 6 Emp Aptitude Survey/ p 7 Key Principles: Commit.to Quality, Resp. for Indiv.s Involvem. of everyone, Creativity & Innovation for Cont. Imp./ p 9 Teamwk Council, Q Action Team, QA Coordr, Ofc Commit, QA Teams, Facilitators
Point 3 Cease dependency on mass inspection	p 20 Focus on the way we do our work rather than on inspecting the outputs of the process
Point 4 End practice of awarding business on price tag alone	p 12 Deal only with competent firms in procurement/ p 13 Measure all key products by suppliers by quality
Point 5 Constantly and forever improve the system of production and service	p 7 Creativity and Innovation for C.I./ p 18 Benchmarking/ p 7 Measurement of Quality reports
Point 6 Institute modern training on the job	p 21 Process review team flow-charted a process, determined changes, and retrained employees/ p 22 Provided technical training to improve mail processing procedures
Point 7 Institute modern methods of supervision	p 2 Education in leadership roles, p 7 TQM training for managers and supervisors
Point 8 Drive out fear.	p 17 Empowerment. Employees given authority to satisfy customers w/o the usual red tape
Point 9 Break down barriers between departments	p 16 Cross-organizational teams/ p 18 Sharing results of accomplishments
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels of productivity without providing methods.	Not mentioned
Point 11 Eliminate work standards and numerical quotas	p 12 Goal to reduce errors, p 14 Emphacize process used, then goal achievement
Point 12 Remove barriers that hinder the ....worker	p 7 Respect for individuals, p 13 Remove barriers to achievement of quality
Point 13 Institute a vigorous program of education and training.	p 9 All employees receive TQM training
Point 14 Create a structure in top management that will push every day on the above 13 points.	p 7 Involvement of everyone, p 8 Union invovement, p 9 training for everyone.

Identification of Components of TQM Relative to Deming's Fourteen Points	
Name of Agency: Dept of Veterans Affairs, Philadelphia, PA	**Location and Description of Activity** **AGENCY #10**
Point 1 Create constancy of purpose	p 1 "A great light dawned. We have been looking at quality from our point of view, not our customers."
Point 2 Adopt the new philosophy	p 3 Principles: Respect for people, Customer satisfaction, Management by fact, Plan-Do-Check-Act, p 8 Quality Improvement, Planning, Control
Point 3 Cease dependency on mass inspection	p 2 Do the right thing the first time
Point 4 End practice of awarding business on price tag alone	Not specifically mentioned
Point 5 Constantly and forever improve the system of production and service	p 2 Continually make small, incremental improvement, p 13 Quality planning assessment is an on-going, never ending task, p 16 Incrementally improve daily operations
Point 6 Institute modern training on the job	p 18 Personal Development training directed at enhancing individual skills and abilities
Point 7 Institute modern methods of training on the job	p 19 Team leader training, but no specific mention of supervisor training
Point 8 Drive out fear.	Not mentioned
Point 9 Break down barriers between departments	p 7 Established mutually supportive QI program among 3 organizations, p 12 Cross-training p 19 Cross-functional teams
Point 10 Eliminate slogans, exhortations, and numerical targets asking for new levels of productivity without providing methods.	p 2 Set goals and objs for org and work to ensure they are realized p 12 "...knew quality didn't mean exhorting our emps to do better or produce error free work." . . . did mean providing them with the training, tools & techniques for improvement.."
Point 11 Eliminate work standards and numerical quotas	Not mentioned
Point 12 Remove barriers that hinder the ....worker	p 3 Empowering employees (in general), p 11 Non-supervisory employees honoring other employees, p 11-12 Employee envolvement, enabling employees to own their own work: ownership of their customer's inquiries
Point 13 Institute a vigorous program of education and training.	p 12 Cross-training
Point 14 Create a structure in top management that will push every day on the above 13 points.	p 11, 19 Everyone received quality training, p 11 Staff meetings, supervisor and division employee meetings, newsletter featuring QI news, Q planning process, training and accomplishments. Special Activities, Q. Fair, Q Day, "Lunch-N-Learn"

Appendix B

The following is a summation of 1) the agencies which received the Quality Improvement Prototype award, 2) the number of components of TQM identified in each agency , and 3) the implementation pathway used.

Agency #1 (1990)
Cincinnati Service Center
Internal Revenue Service
Department of the Treasury
TQM components in early 1980's
Committed to TQM in 1986
Nine TQM components identified
Indirect Pathway

Agency #2 (1990)
Defense Industrial Supply Center
Logistics Agency
TQM components in 1982
Committed to TQM in 1987-88
Nine TQM components identified
Indirect Pathway

Agency #3 (1990)
Johnson Space Center
National Aeronautics and Space Administration
TQM components in 1982
Committed to TQM in 1986
Nine TQM components identified
Indirect Pathway

Agency #4 (1991)
1926th Communications-Computer Systems Group
Warner Robins Air Logistics Center
Air Force Logistics Command
Department of the Air Force
Committed to TQM in 1988
Ten TQM components identified
Direct Pathway

Agency #5 (1991)
Sacramento Air Logistics Center
Air Force Logistics Command
Department of the Air Force
Committed to TQM in 1987
Eleven TQM components identified
Direct Pathway

Agency #6 (1991)
Aeronautical Systems Division
Wright-Patterson Air Force Base,
Committed to TQM in 1987
Twelve TQM components identified
Combination Indirect/Direct Pathway

Agency #7 (1992)
Defense Contract Management Defense
District Northeast,
Boston, MA
Committed to TQM in 1988
Ten TQM components identified
Direct Pathway

Agency #8 (1992)
U.S. Department of Labor Wage
and Hour Division
San Francisco Region
TQM components in 1980's
Committed to TQM in 1988
Ten TQM components identified
Indirect Pathway

Agency #9 (1992)
Public Services and Administrative
Patent and Trademark Office
Department of Commerce
Arlington, VA
Committed to TQM in 1989
Thirteen TQM components identified
Direct Pathway

Agency #10 (1992)
Department of Veterans Affairs
Philadelphia, PA
Committed to TQM in 1988
Direct Pathway
Eleven TQM components identified
Direct Pathway

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