Government Division
ASQ The Global Voice of Quality®

April 2017

Systems Management as an Agile Quality Framework

Richard E. Mallory, MM, PMP

An essential but broadly overlooked management practice for government executives and program managers is to identify and manage their critical (or key) management systems[1]. Only through such systems management is it possible to understand and document the most positive practices, consistently replicate positive organizational results, and to learn and improve based on past practice. This management discipline will also allow executives the ability to learn and improve on their current achievement, and to better respond to changing conditions[2].

The practice of key systems management has recently been identified by the ASQ Government Division as the next frontier of quality management, and one that should change the fundamental expectations of all public sector managers. The failure to manage predictable and cyclical key systems is a failure to marshal the greatest organizational wisdom and to support organizational excellence to the greatest extent possible. It is also a failure in the adaptation and use of the known beneficial practices of lean and quality science[3].

Where systems are thought about as functions of control, authorization, decision making, or oversight, they are often viewed as either isolated activities or sequential decisions that are only manageable through spontaneous or consultative decision making by individual managers. This kind of thinking leads to the conclusion that the actions of executives are somehow above or isolated from the application of lean and quality science. This, in turn, leads these managers to believe that the actions, events, and activities they use for decision making and program direction should not and cannot be standardized and documented. They incorrectly believe that executive actions should be created by their individual intuition and contemporaneous judgments, which also means that they are reactive and insulated from organizational wisdom! This belief must change.

---

[1] Systems can be defined as a network of interdependent components that work together to accomplish a purpose. This is the definition of system provided by W. Edwards Deming in *The New Economics*, 1993, Massachusetts Institute of Technology, Center for Advanced Engineering, pg. 94-118.

[2] The author demonstrates that the highest-level leadership systems, including governance itself, can be brought under the analytic methods of continuous quality improvement through application of systems management. This management framework, along with a process management standard and an aligned leadership objectives standard are outlined in his book, *Quality Standards for Highly Effective Government*, Trafford Publications, 2014.

[3] Quality science is defined as the tools and knowledge associated with quality management. It had its origins in the Toyota Production System of the 1970s, and embraces a broad body of professional knowledge focused on doing work right the first time. It is used as the basis of the U.S. Baldrige Performance Excellence Program and the Japanese Deming Award. It is embodied in the ASQ Body of Knowledge.

In fact, *all* systems have repetitive and predictable components that are ideally suited to fact-based management and the principles of quality science. This article therefore presents the perspective that approach and deployment of such systems is fundamental to excellence in management, with the development of mature managed key systems as an auditable and documentable goal. A focus on mature managed systems will standardize patterns of practice with the greatest history of positive results, build in risk management and scenario analysis, and support dependent processes throughout the organization—which in fact are the suppliers or customers of management systems!

Identification of Key Systems

The best way of beginning on the path of finding and defining such systems and adequately describing them is to develop an extended mission statement for each executive and program office, which can also be described as its business purpose. Managers of the office may then be able to see systems that correspond to each sub-category of the named business purpose, or they can proceed onto further analysis by listing the primary objectives of their position or office. Once such headings of purpose are established, they can be further tested by the defined outputs and outcomes intended to be delivered through each purpose (or system). Those who have used the SIPOC[4] tool may see a close parallel, and will find that systems are defined through identification of inputs and intended outputs.

While each executive's list of roles (and thus of systems) may be long, they should only focus on the primary areas of value creation, which we will call key systems. This is due to the fact that key systems management is a tool used for improvement of performance, and improvement activity requires management time, therefore only key systems should be prioritized. This will require the selection of one or a few such key systems from a longer list. This list should describe what the office is established to do, and should have a clear link to organizational mission, purpose, or functionality.

Initial Evaluation of Each Key System

In this step the manager must perform an initial evaluation of the current performance of each defined system, and juxtapose that with its current results. This provides feedback on its current, or baseline, performance and a first effort to define its desired performance. A list of system design requirements (similar to customer requirements) can be established in this way. This may be done both through identification of who uses the products of the system, and by defining the attributes of the outputs and outcomes that are desired.

This line of inquiry and documentation will also reveal which organizational systems or processes may provide inputs into the defined system, and are therefore its suppliers, and which are users of system outputs, and are therefore its customers. The use of the principles of the voice of the customer then follows, and provides an excellent way to validate and quantify the system output requirements. This, in turn, will enhance the assessment of its current performance, and will **identify areas of improvement**.

It is also recognized that systems may have associated characteristics imposed by law, regulation, standards, or policy that also must be included. So, a decision about hiring, for example, may have additional necessary characteristics. Perhaps it will need supporting analysis, a cost-benefit ratio, a risk analysis, an action request and a communication plan. It may even need a decision in light of competing professional opinions about need or benefit[5]. These can be regarded as corollary outputs, and built into the overall system requirement. Since this overall requirement is clearly more than a traditional end-user customer requirement, we have developed the term design requirement to reflect the fact that many of its attributes are imposed by other authority.

All the system design requirements taken together with its defined performance metrics and indicators provide the

---

4 An analytic method that defines supplier, input, process, output, and customer. In this case, we would substitute the "key system" name for process.
5 Project management is also a form of systems management, and this article provides a specific and uniform framework for that discipline as well. The definition of the output and outcome requirements for projects is particularly necessary, as is the balancing of the attributes of scope, schedule, budget, and quality.

characteristics of what we will call the object of value creation (OVC). This new term is provided to reflect the fact that systems—unlike processes—may have variance in what is to be included from cycle to cycle[6]. The OVC can be expected to need update from cycle to cycle, which emphasizes the need to identify and manage the intervening variables that cause that variation. Scenario analysis then becomes a new tool of systems management to reflect that variation.

Definition of the System

Systems have a triple constraint. In the first instance, the requirement of the OVC in each system cycle cannot be known in advance. It may vary and this variance includes both the basic nature of the thing or things being worked on (the input), and the characteristics of the work that is required that lead to the end product (the desired output)[7]. Secondly, and in direct parallel with project management, the resource group and the commitment of resources to any systems cycle is variable. Third, the required path (or map) of the work output may necessarily vary. These variables all require attention and calibration of the system map at the start of each cycle.

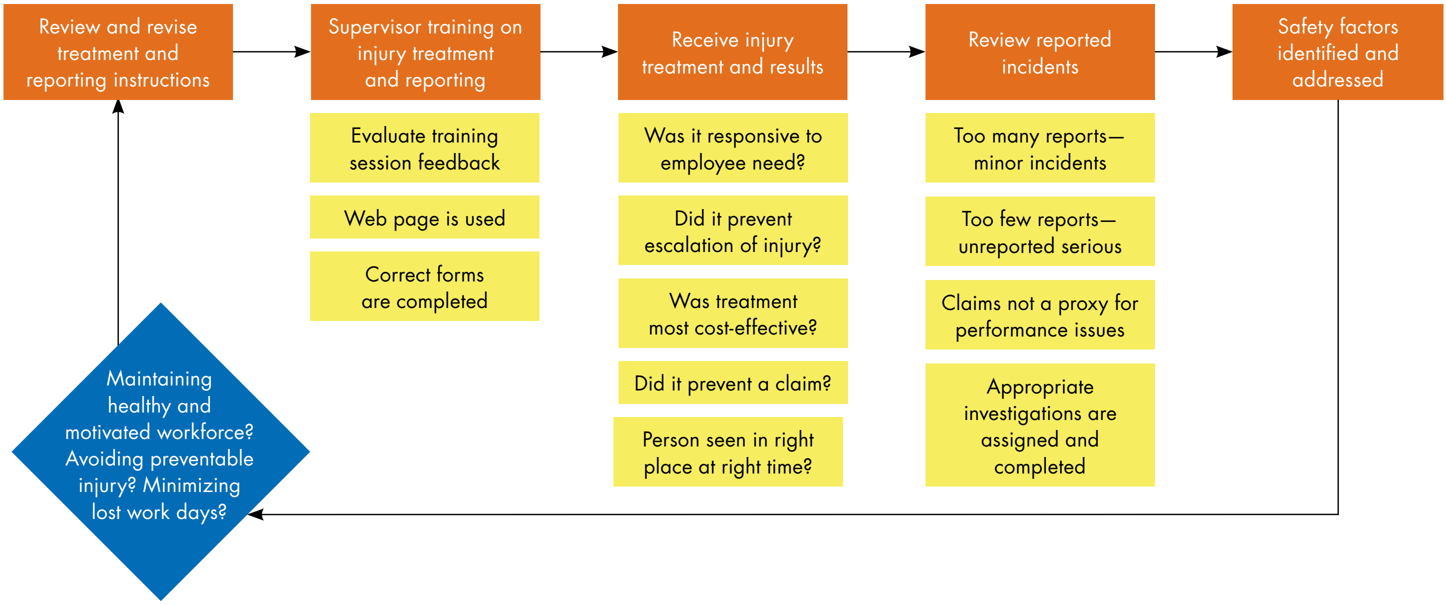
The mapping of a system will then first require a calibration of each cycle, followed by an update of its map. This mapping activity must consider three design categories including a baseline system definition that defines those system activities that are known and constant, those that vary but are within the normal span of control of the organization, and those that vary and are outside its span of control.

Process mapping then provides a rudimentary model for systems management, and especially for those system activities that are known and constant. These should be documented in principal activity groups, illustrated in the example diagram below.

Systems mapping must show the principal activities, actions, and check gates that are required, including the inputs and steps for the systems output. The inputs and steps in the diagram can be considered influencing factors and are included to the extent that they are known to contribute to or influence the achievement of the defined activity group or milestone.

Here, the use of the project management system is directly analogous, with its defined key activity groups of initiation, planning, execution, control, and closing[8]. The idea of project check gates from project management principles is also appropriate, because it suggests a series of review points through which the OVC must pass.

Oversight and Use of Injury Reporting and Investigation



[6] Processes tend to have more specific and quantifiable outputs, with fewer attributes, while systems have more attributes and those that require assignment of general and descriptive attributes, with some that require balancing of competing values (i.e., highest ethical standards).

[7] A classic example might be the system of strategic planning, where both the preparation and research inputs may vary greatly from cycle to cycle, as may the group of experts asked to participate.

[8] Project Management Institute, Project Management Body of Knowledge.

In **system management**, we should then define a map of such activities, actions, and check gates that are subordinate parts of contributors to the necessary output.

As noted, each check gate, or principal activity group, is known to be a contributor to the output requirement of "Safety factors identified and addressed," and this map reflects the known repetitive factors of the positive result. In addition, the subordinate contributing factors have also been identified.

Once established, an effort must be made to ensure that the system's actions and flow are predictable and reliable. The control factors most relevant to systems management are:

1. Resource availability
2. Defined output and outcomes, and their influencing factors
3. Response to common intervening variables (perhaps through scenario analysis)
4. Risk management (for response to factors beyond the span of control)

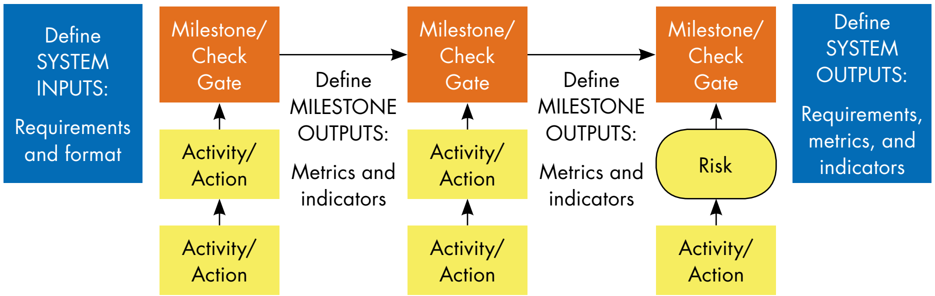
Resource availability is perhaps most commonly seen and discussed with regard to project management. Often it requires that assigned personnel and resources are available, accountable to the system requirements (or project), and focused on its goal. In another similarity, the use of a RACI matrix[9] to define responsible, accountable, consulted, and informed personnel at each task and activity, is a major system improvement. This kind of resource group control must be the result of leadership and communication. For this reason, the resource groups and accountability at each action step or milestone should be defined.

In the use of systems mapping for predictable cycles of output or for projects, the chronological tracking of check gate completion would be paramount, along with checking for completion of output requirements at each check gate.

Where common variables are involved, scenario analyses should be developed for each variant to reflect the best practice reaction. So, for projects, scenario analysis should include contract change requests and change management. Where known risks affect the system, a risk management plan should be in place.

Finally, in order to evaluate what is to be accomplished at each step (outputs), and to evaluate whether the subordinate contributing factors that are currently in place address an excellent outcome, then requirements for completion of each check gate should be developed. In that sense, the systems map should look like the following.

Methods of Systems Management



Overall, the systems map should define OVCs and responsive actions, and show where intervening risks must be managed. Contingency plans, communication plans, and communication protocols should also match scenario analysis. Variance in the assumptions and constraints imposed on actions and outputs should also be quantified as a part of the analysis of predictable variation within the system. Note that each activity/action group can be seen to influence or contribute to completion of the defined milestone and check gate.

Definition of the system should provide the best-known plan for achieving the purposes for which it was commissioned (its system requirements), and should describe an approach and deployment for the operation. It should also provide for the alignment of the system within its host organization, reaching upward to the overall business purpose, and reaching downward to the individual processes that are supported or controlled by that system. The efforts to align all systems create organizational synergy, and open the door to eliminate barriers and to encourage synergistic relationships everywhere.

Finally, once the system is defined in this manner, and a formalized feedback loop is in place, it allows systems managers to identify points of constraint and waste, and to apply the tools of lean and continuous improvement. In this way, structured systems management provides an agile and flexible framework for overall organizational improvement, and a force for the long-term sustainability of its close cousin, lean process improvement.

[9] From the Project Management Body of Knowledge: The definition of roles for each major activity group include responsible, accountable, consulted, informed (RACI).

The author believes that the definition of a uniform and empirical method of measuring the maturity of systems will be the next major platform for the deployment of quality science in our greater world, and invites those in the quality profession to review, use, and suggest improvement to the following systems management standard.

Richard E. Mallory, *MM, PMP, served as chair of the ASQ Government Division in 2013 and 2014, and is a principal consultant for CPS HR Consulting in Sacramento, CA. He is author of* Quality Standards for Highly Effective Government, *Trafford Publishing. He is a seven-time examiner for the U.S. and California Baldrige Quality Awards and a career-long practitioner of quality in government. He can be reached at rich_mallory@yahoo.com.*

System Management Standard – Summary Version

The systems management standard is measured through evaluation of four criteria areas, including:

1. System purpose and structure
2. Goal directedness
3. Management of intervening variables and risk
4. Alignment, evaluation, and improvement

The following tables show the progression of each scoring criteria area, from a numeric score of 0 to a score of 5. The system management standard, complete version, is available at:

asq.org/gov/2016/09/system-management-standard.pdf

Systems Purpose and Structure
0 – The system is named and has known purpose, but no structure. Specific system actions, events, and activities respond to outside influences and may be based on political agendas or individual judgments, without regard to analysis or past learning experience.
5 – There is documented evidence of an ordered system that delivers uniform and predictable quality outputs over multiple operational cycles. The ordered system is supported by a system map and supporting documents covering all tasks, accountabilities, and contributing factors. Major intervening variables and system risks have been identified. The system map links to process maps as necessary, to accomplish organizational goals, and requirements statements for process inputs or outputs are built into system requirements. System deployment is specific to the means used to manage the system and to ensure its continuing operations according to design. Operational deployment is supported by responsibilities and accountability for each contributing resource group, and through the use of indicators and performance measures for all principal activity groups. There is evidence of the use of this system management structure for three or more years.

Goal Directedness Through Measures and Feedback
0 – The system has no clearly defined outcomes, and no expectations for its performance. Its hoped-for outcomes are ambiguous.
5 – Performance feedback and objective measures are linked to this system and all its defined activity groups. Positive levels and trends exist for the entire system and for all its principal activities. Several indicators and measures are available for each defined activity group. There is evidence that the performance of this defined system has improved and contributed to improving organizational outcomes over three or more years.

Management of Intervening Variables and Risk
0 – Intervening variables and risk have not been identified or are unknown.
5 – The risk management plan is analyzed and reviewed at least annually. System design and structure has been modified to lessen the impact or occurrence of intervening variable and risks. There is documented evidence of the use of analysis to lessen risk and system impacts. Root cause analysis is used to design risk management plans. There is documented evidence of systems learning and improvement.

Alignment, Evaluation, and Improvement
0 – There are no systematic efforts to learn and improve. The resources and personnel that constitute the system do not recognize its existence.
5 – There is evidence of continuous systematic annual improvement, participated in by all defined systems personnel. Responsibilities, accountability, consultation, and informing roles have been identified for each primary activity group, and for dependent tasks and activities. There are measurable, positive results on outcomes, and in each activity group, with demonstrated positive relationship to all dependent processes.