The IBM-QMI Partnership for 2QR® Complete Quality Management

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"Because the stakes are so high, we cannot afford to let our commitment to quality waver. The first step in keeping it solid is to accept ownership of everything we do. This means standing behind every piece of work as if your name and reputation were squarely on the line. So the push for improved quality continues. It's not that we have no other choice; it's that we wouldn't have it any other way."

John F. Akers, IBM CEO 1985-1993

Abstract

Never have the challenges of complex product and systems development been greater. Rising complexity coupled with the need for fast development cycle times and lower development and support costs have driven development efforts into a Faustian dilemma. Is it better to become highly agile by forgoing documentation, process and discipline—or to labor under the burden of restrictive, formal processes which use much needed time for non-development activities like planning, design and documentation? As some development organizations sell their quality souls for expediency, while ignoring the eventual price they may pay, others stay the course, hoping their ponderous processes do not leave them vulnerable to disruptive start-ups and new business models. Is there a better path? Yes, modern development concepts properly deployed and implemented in an IBM-QMI 2QR® Environment provide a choice of chaos versus quality.

The dramatic growth and development of the Internet of Things (IoT) has produced new kinds of risks and unknowns that can result in dangerous unintended consequences and the increased impact of undiscovered defects on people and processes. Reports of major security defects and breaches of data storage have become commonplace.

As has always been the case, effective and successful product and systems development is a function of optimally employing people, process and tools. In what follows, we will describe the important challenges and opportunities in each of these three areas, and show how a Complete Quality Management approach provides the context, values and standards for achieving both short and long term success.

Complete Quality Management, as embodied in the 2QR® (Second Quality Revolution) Environment, has all of the protocols, due diligence, rigor, systems thinking, and scientific thought associated with

Complete Quality Management

People

Tools

Process

1QR. It also includes the added emphasis of 21st century techniques, and the ability to train and retain high-performers. The IBM partnership with the [Quality Management Institute](#)[1] (QMI) provides solutions for more effective client use of the IBM Collaborative Lifecycle Management (CLM) platform and the improvement of the supporting culture for software and systems development.

IBM has partnered with the Quality Management Institute to provide IBM's customers with the practices and training resources that will influence a return to the values, principles, systems thinking, due diligence and rigor of the first quality revolution along with realistic Agile and Lean principles for development.

1.0 Dangers of Racing Past the Facts

The emergent properties of the IoT have compounded the existing challenges for the effective delivery of complex systems and digital offerings and services. The application of Agile development concepts has only partially improved the overall effectiveness in delivering digital solutions to a commercial environment. Factors such as the increased pace of disruption, widespread connectivity, the general surge in complexity of components and systems, the related problems of security, and the often improper application of Agile development concepts have created a broad range of significantly increased risk. This has created the need for new methods of risk management that can exceed the limited capability of legal maneuvers and accounting calculations. What's required to reduce the risk factors and to increase our effectiveness and overall economic value is a well-trained and insightful workforce capable of applying software tools with both precision and relevance.

TOOLS ARE NO SUBSTITUTE FOR MATURING THE WORKING CULTURE WITH THE VALUES TO WRAP AROUND AND SUPPORT COMPETENCIES.

Customers who see the introduction of a tool as a silver bullet to fix a fundamentally broken process don't typically succeed. Software development tools, when implemented properly, can help increase capability and reduce defects. They can also reduce the gaps and inconsistencies in systems thinking and solidify the application of Quality Management. They are no substitute, however, for a mature working culture with the *values* to wrap around and support *competencies*. Without the proper supporting culture, users of software development and delivery tools such as IBM Collaborative Lifecycle Management are by default underutilizing the tools. The result is often lost opportunities to recognize legitimate options for agility and leanness. People may then find themselves "filling in the form" without the ability to wisely and effectively manage the development process. Users therefore fail to realize the true value of the tool. What naturally follow are gaps in leadership that are produced as organizations matriculate their practitioners into management.

Organizations often attempt to implement training and other programs to increase awareness of customer service and the foundational concepts for keeping the promises they make to their customer and/or the end user of their production process. However, the training they provide often lacks both the practical cognitive and theoretical supports for the work culture that are required to effect the relevant changes in both mindset and competencies. Thus, the commonly executed *cultural change* and/or *continuous improvement* process can produce the very opposite of its

intended outcomes. Instead of producing well-trained and responsive associates, the sterile emptiness of the program can produce cynicism and employee disengagement.

These workplace factors represent opportunities to increase productivity and profitability by lowering the defect rates and associated risks. The 2QR training resources will provide the work-culture enrichment for a return to the values, principles, systems thinking, rigor and due diligence of the first quality revolution along with realistic Agile and Lean principles for development. 2QR resources also provide the added emphasis of 21st century HR sensitivities and training to develop and retain high performers.

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2.0 The Commercial Definition of Quality and How it is Measured

The management of quality is synonymous with fulfilling customer requirements or expectations. And the measure of how well we fulfill their expectations is commonly generalized as customer satisfaction. Since customer satisfaction has been repeatedly correlated to market share and profitability, we can more specifically appreciate one of the fundamental concepts of Quality Management: It is laser-focused on the customer's needs and fulfilling the promises we have made as the primary determinant of all management and leadership actions.

Philip Crosby defined quality as "conformance to requirements" and measured it by the "price of non-conformance"[2] —what we lose in profits, customer loyalty, etc. when we fail to deliver on the promises (or sales points) we have made to our customer. The implementation of Quality Management systems and methods is intended to recapture lost profitability and stabilize the delivery of products or services with efficiency–keeping our promises in specific, measurable and deliberate actions that fulfill our customer's requirements.

When our systems and processes produce products or services with defects, our customers react with dissatisfaction and often demand replacement, re-work, etc. even beyond what has been allowed by the warranty. How reasonably and effectively we react to their dissatisfaction may well determine market share and profitability because in the era of social media a failed customer experience can go viral and send the producer into an expensive process of damage control.

Overall development costs are greatly lowered by investing in Quality Management. It's because the simple calculation of what it costs when we do things wrong versus what it will cost to eliminate the conceptual and implementation errors in our development process and the resulting defects experienced by our customers will show an actual reduction in expenses. It's called the *cost of quality*. Philip Crosby said that "Quality is Free."[3] That's because the commitment to invest in doing things right and preventing costly errors and re-work almost always results in higher profitability. In

addition to the intangible and qualitative measures of reducing chaos in a work culture, the American Society for Quality[4] says that the costs of poor quality in a thriving company will be about 10 to 15 percent of operations.

An example of opportunities to eliminate lost profits can be found in the Chaos Manifesto published by The Standish Group. In 2015 they reviewed 50,000 IT projects and their findings were very significant. An InfoQ.com[5] interview with Jennifer Lynch of the Standish Group revealed that only 39% of the projects that were guided by Agile concepts were successful as measured by their having reached their budget, schedule and feature objectives. 52% of projects using Agile concepts were challenged while 9% were outright failures. At the same time projects guided by Waterfall concepts were successful only 11% of the time with 60% challenged and 29% outright failing.

So even though the report indicates that Agile concepts performed significantly better than Waterfall concepts in reaching their budget and schedule goals, a 39% success rate leaves a lot to be desired in efficiency, effectiveness and profitability. Watts Humphrey noted that "The quality of a software system is governed by the quality of the process used to develop and evolve it. In today's software marketplace, the principal focus is on cost, schedule and function; and

"QUALITY IS FREE" [3] *BECAUSE THE COMMITMENT TO INVEST IN DOING THINGS RIGHT AND PREVENTING COSTLY ERRORS AND RE-WORK ALMOST ALWAYS RESULTS IN HIGHER PROFITABILITY.*

quality is lost in the noise. This is unfortunate, since poor quality performance is the root cause of most software cost and schedule problems."[6]

3.0 The Orthodoxy of Quality Management and Agile Methods in Software Development

Quality Management is called out as a key element in many professions, but it is often not given as much attention as other disciplines. As a system of thought, Quality Management provides much more than a rationale to audit things, fix the bugs and get to a deliverable. Quality Management is Agile and responsive to "UURVE" conditions—Unpredictability, Uncertainty, Risk, Variability and Evolution. However, if your method of applying Agile concepts includes racing past the facts to achieve a deliverable, there is a substantial probability (61% using the Standish Group figures) of experiencing limited success that includes re-work, increased costs and sliding deadlines.

Stefan Nowaczynski has said that "Agile is a mindset, defined by values, guided by principles and manifested through many different practices."[7] This definition is consistent with the principles of Quality Management. Agile or Lean concepts naturally align with Quality Management because in their orthodoxy they are in harmony with the values and methods of Quality Management–the defining, development, testing and delivery of outcomes that were promised. That's why, when properly implemented in more modern development methods they work so effectively, but when they're not properly implemented the result is a 39% success rate, which looks good only when mistakenly compared to improperly implemented Waterfall methods!

One might think of NASA's Apollo program as a period of time when Waterfall methods prevailed—and that's accurate except that the methods were implemented more reasonably and effectively. But an example of Agile methods in the context of Quality Management and the potential of 2QR is NASA's Apollo 13 moon mission. Although there were six successful moon landings, Apollo 13 is considered one of the major engineering achievements in aerospace history. It's because of the Agile methods that were applied to achieve the rapid resolution of several life-threatening factors and the re-programming of the essential data required to recover from what would have been a gigantic failure—a failure that could have easily ended the Apollo program ahead of schedule. Gene Kranz, the Apollo 13 mission director is famously portrayed to have said "Work the problem, people. Let's not make things worse by guessing."[8] The Apollo team responded effectively to this

THE APOLLO TEAM RESPONDED EFFECTIVELY BECAUSE OF THEIR PRACTICED KNOWLEDGE OF THE PROCESS REQUIREMENTS, THEIR SUPPORTING VALUES AND TECHNICAL FUNDAMENTALS, THE TEAM'S ABSOLUTE COMMITMENT TO DUE DILIGENCE AND THE ABILITY TO THOROUGHLY TEST EVERY POSSIBLE SOLUTION—ALL ROUTINE ATTRIBUTES OF THE FIRST QUALITY REVOLUTION.

directive because of their practiced knowledge of the process requirements, their supporting values and technical fundamentals, the team's absolute commitment to due diligence and the ability to thoroughly test every possible solution—all routine attributes of the first quality revolution.

The design and production requirements for any project must include not only the technical requirements for creating the product or service but the sales, marketing and management requirements required to succeed. This baseline of information management is the foundation for the effective use of Agile methods. The failure to properly identify and document the requirements of the end-user, the participants in the design and production process (including vendors), and the delivery and servicing units, and then reasonably manage their evolution creates gaps in traceability and the inability to apply systems analysis to the project. Any change of requirements must be systematically and systemically reviewed and tested for its possible effect on the other parts of the requirements continuum. A failure to do so is likely to create unintended consequences that will not surface until the process matures and begins to produce defects. Defects discovered late in a development process can cause a ripple-effect across an entire project and create unwarranted expense and chaos. It is far more expensive to correct errors at the later stages of a project than to define the requirements properly in the beginning and carefully manage the discovery and implementation of needed changes.

It is important to note how well these and other fundamental Quality Management concepts and practices align with the key capabilities of the IBM Collaborative Lifecycle Management platform. Analyzing the impact of a change in requirements, for example, is both a key Quality Management activity and also one of the primary usage scenarios used in demonstrating the end-to-end lifecycle capabilities of the CLM Platform. Other examples include root cause analysis which requires requirements traceability between requirements and between requirements and found defects.

Quality Management is purposely restraining and Lean, and when it is properly harnessed to Agile methods it produces a reliable synergy with outcomes that are much more predictable with respect to planning and budgeting. The [Harvard Business Review](#)[9] discloses that the average IT project schedule overrun is 27%. In fact, one in six projects have a cost overrun of 200% and a schedule overrun of almost 70%. Remember, these numbers represent an average success rate of 39% for projects managed with Agile methods. These statistics do not include the value of the inherent lost opportunities. The metrics in this study provide significant financial opportunities for a return on investment by incrementally increasing the investment in the accurate discovery and definition of design requirements, the harnessing of reasonably implemented Agile concepts and the delivery of predictable, well-planned outcomes that create increased market credibility.

4.0 Quality Management Fundamentals, Testing, Documentation and the Business Plan

"From the beginning of time, the basic transaction between people has been the promise to exchange value for value. These promises are the foundation for all business and personal relationships and the cornerstone of commerce. Since then, the only things that have changed are the technologies we have developed to fulfill our promises. The invention of money, cash registers, credit cards, computers, railroads, trucks, airplanes, ocean-going ships and educational technologies such as Quality Management are the result of competition to discover more effective methods for keeping our promises. As each generation of business leaders emerge, we have also learned new and better ways to teach, train, coach, mentor and manage ourselves and others, all for the purpose of *keeping the promises* we have made." (Kennedy, 2005)[10]

Philip Crosby said that "Quality is defined by conformance to requirements and that the system of quality is prevention."[11]   In its simplest definition, Quality Management is focused on preventing defects from reaching our customer and thus diminishing their level of satisfaction. The prevention techniques include 1. Quality Control (QC) methods for monitoring, testing, auditing, etc.—or taking bad things out of our processes, and 2. Quality Assurance (QA) methods for putting good things into our processes—including reliable, well trained human resources, pre-tested materials and facilities, well-written procedures, the appropriate software tools and development methods, etc. QC is a fundamental of manufacturing history and QA is rooted in reliability engineering and testing that was shaped in aerospace engineering. Together QC and QA form the essential methodologies of Quality Management.

These fundamental attributes of Quality Management are the foundation for a successful and profitable business plan. Unfortunately, a conflation of definitions and a dilution of methods and techniques has taken place in the management of quality. Today, it's not unusual for people who are completing a simple monitoring form to be misled into thinking that they are fulfilling all the required mandates of Quality Management, when, in fact they are fulfilling a very narrow piece of its disciplined continuum of tasks.

The methods and techniques of *Quality Assurance* are sometimes conflated and narrowed to a series of often ill-conceived or poorly planned tests or some other form of assuring that what's been promised is what's been done. However, the measurement of "the promise" is often lacking in its length, breadth and depth of the knowledge of the requirements. The net effect of this degrading of concepts is that testing is often little more than guessing with ill-conceived and incomplete tests

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falsely assuring both the producer and the customer. Quality Management has in many cases dissolved into simplistic testing without a proper perspective of the many what, why, where and how details of the wider continuum of requirements.

One area of concern regarding the conflation and dilution of methods and techniques can be found in the incomplete design and documentation of testing and its results. Another is in the diminished valuing of the accurate documentation of coding changes and repairs. These two simple examples can dramatically complicate tracing and troubleshooting the causes of errors. We may be able to discover through research that the root cause of a problem is a previous coding edit, but we often are left without information as to why that edit was made and how it relates to various requirements. The premise for making the edit might have been well-founded in the requirements and there was only an error in execution of the coding. Or it could be that the coding would have been a perfect fix, except for the unintended consequence created by the failure to acquire a more thorough understanding of the requirements. The discovery of the cause and correct resolution of the defect is always more expensive and time consuming than the cost of proper documentation at the time of the change by the person who made it.

QUALITY MANAGEMENT HAS IN MANY CASES DISSOLVED INTO SIMPLISTIC TESTING WITHOUT A PROPER PERSPECTIVE OF THE MANY WHAT, WHY, WHERE AND HOW DETAILS OF THE WIDER CONTINUUM OF REQUIREMENTS.

This graph of data from an actual client vividly demonstrates the rapidly increasing cost of finding and correcting a defect and its root cause along with the costs of rework as the project progresses.

A defect discovered during the requirements phase could be corrected for only $30, while a defect found and corrected during testing escalated to $10,000. And when a defect has reached the customer during implementation the cost has risen to $1 Million.
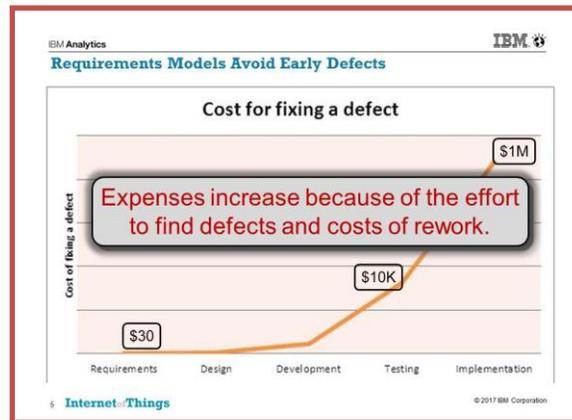
When the members of the C-Suite and the Program Managers agree on a business plan, they are not typically aware of these looming pitfalls in their planning and budgeting efforts. As a result, the unplanned expenses and schedule overruns become a source of confusion and conflict. This is why so many of the unintended consequences and the resulting management decisions that are made to triage and save the business plan create organizational conflicts and why a 2QR Environment is prescribed.

5.0 The Organizational Context of 2QR® Culture, Workplace Disengagement and Quality Initiatives

John Wooden, the famous UCLA basketball coach asked this simple question: "If you don't have time to do it right, when will you have time to do it over?"[12] To take this premise further, is anything more destructive to a business culture than repeatedly scrambling to correct errors in communication, or to recover from customer service failures, or to tinker with schedules so that re-work on an important project can be completed, or to be sidetracked into personal disputes or arguments about process without a common language to have a reasonable discussion? When these activities and the corrective actions they require are commonplace, they negatively impact efficiencies and profitability because it always costs less to do it right the first time. Not only that, the Leader's credibility—that intangible sense of stability and reliability essential to leadership—is damaged.

The 2QR Environment provides the foundations and essentials for creating a technical culture with values-based, facts-driven principles to wrap around and support competencies. Quality Management also reduces the sometimes oppressive burdens of corporate citizenship, providing a common language to bridge the gaps between engineering, IT and the C-Suite. Its reasonable and noble qualities also tend to refocus the disengaged worker whose high-performing past may have been diminished by disillusionment.

WHEN MANAGERS MODEL 2QR® PERSONAL AND PROFESSIONAL VALUES AND ASSURE THAT EACH PERSON IN THE WORKPLACE IS TRAINED AND HELD ACCOUNTABLE TO THEM, QUALITY INITIATIVES WILL BE EMBRACED BY THE WORKFORCE.

Employee disengagement has moved to the forefront of leadership challenges. Managers must now be capable of functioning as effectively in team-building and values-based discussions as they are in task delegation and production management. One indicator is that "human factors integration" is no longer just about ergonomics and limited to solving the problems of people interacting with machines. It has become the code word for the vulnerabilities of a workforce with deficits in education, experience and work-ethic. For a manager to overcome these deficits and succeed he or she must have the emotional maturity and leadership skills to support the vision, complete the task agenda and implement the right human resource initiatives.

An article in the Los Angeles Times[13] reported on a Gallup Poll which measured employee disengagement. It stated that 70% of the U.S. respondents, 84% in Canada and 83% in the U.K. said that they were either disengaged, actively disengaged or hate their jobs. Actively disengaged employees tend to create conflict and poison the work environment. The study also concluded that *actively disengaged* employees cost the U.S. $450-550 Billion per year, not including those that are just *disengaged*. Disengaged workers also shift the workload to the engaged high-performers and frustrate them into disillusionment, low-performance and mobility to other work environments.
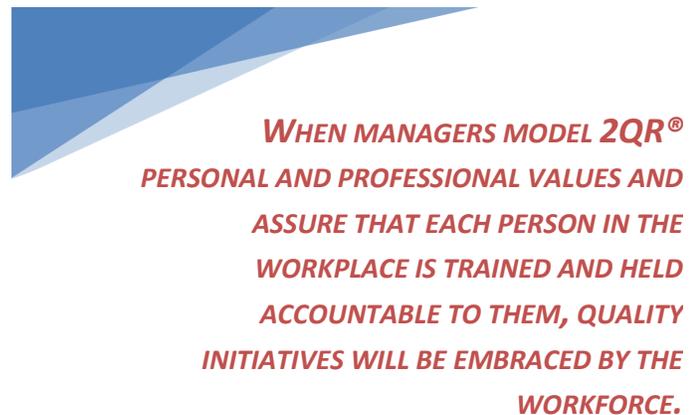
An article published in INC.com[14] broke-down the Gallup Poll this way: Organizations with high employee engagement have 21% higher productivity, 22% higher profitability, 25-65% lower turnover and 37% less absenteeism and tardiness. This translates into higher earnings per share and a vital working culture.

21st Century managers must discover how to train the trainable, correct the correctable and provide sufficient training and accountability to engage and maintain a viable work culture. A Journal of Organizational Behavior[15] study showed that workers with a stronger sense of psychological ownership have higher job satisfaction and organization-based self-esteem. At its core, psychological ownership is about an employee's possession and stewardship of an organization's core values and the pride they have about their enterprise/mission. It is an essential element of workplace engagement. In a 2QR Environment[10] each person:

   1. Keeps the Promise made to each customer with a **Zero Defects Attitude**.
   A Zero Defects Attitude is not just a concept for eliminating defects in a product or service; it is an attitude of the heart. Similar to the pride of workmanship, it represents a desire to do things right, every time we take action. It is not an attempt to achieve perfection but a commitment to make each customer's experience as close to what was promised as possible.

   2. Models the **Vocational Certainty** of a trained and experienced person.
   Vocational Certainty is a measure of our faithfulness to our career agenda. When we have been disciplined about developing our skills and talents, we can acquire the self-esteem and confidence that accompanies earned success. Vocational Certainty challenges us to become equipped by education, training and experience to perform effectively and grow in leadership.

   3. Diligently plans and budgets resources to produce reliable **Process Quality**.
   Process Quality is a measure of our mastery of planning and budgeting disciplines. Applying list-making and project management principles will enable a person with good ideas to bring organization to his or her work, improve their communications skills and establish the influence that is critical to career growth.

   4. Achieves **Administrative Consistency** by giving attention to the details.
   Administrative Consistency is a measure of our attention to details. When people think of managing details, they often picture a bookkeeper or a shipping clerk making sure all of the names and numbers match on a shipping list—but what about the details your customer mentioned concerning delivery schedules, financing and his or her personal preferences for communications?

   5. Demonstrates **Executive Credibility** through sincerity and skill with people.
   Executive Credibility is a measure of our sincerity and skill with people. Sincerity comes naturally from the heart. You either have it or you don't. But skills can be sharpened and improved. By adding 2QR values and methods to your routines, people will gain confidence in your leadership, especially when you take time to listen to them and give them clear, competent answers.

   6. Resolves to maintain **Personal Authenticity** with customers and co-workers.
   Personal Authenticity is a measure of our resolve to be consistent with our customers and coworkers. There are indicators of consistency in leadership all around us. They're recognized

by how we routinely depend upon products and services that support our personal or business lifestyle. Though it may not be visible, somewhere an authentic leader is working diligently to make our experience feel normal.

7. Administers money and all practical matters with **Ethical Dependability**.
Ethical Dependability is a measure of our trustworthiness in practical matters. It is clearly indicated in the ways we handle money and exercise our organizational authority. It is also measured by whether or not people turn to us when they want things to work right, run on time, and be there when they are needed.

8. Creates a culture of **Mutual Respect, Accountability and Professionalism**.
A 2QR Environment is measured by the natural presence of mutual respect, accountability and professionalism. And for these values to prevail in an organization's culture, they must become the practiced values of the leadership. Whether you're the CEO of your company or a manager who's diligently laboring to overcome a decline in production, you can establish a 2QR Environment where you have authority by making these values the central theme of your personal business doctrine and policy. (Kennedy, 2005)[16]

While the IBM-QMI partnership provides customized offerings via the 2QR Environment and the Collaborative Lifecycle Management Tools, these values are always part of our training and support the competencies to be achieved. Whether it's Agile or Lean methods or the details of process management, all projects will function more efficiently and effectively when the team members have the correct technical training on the CLM tools and are supported by these work-culture values. There is also an emphasis on the fundamentals of list management, systems thinking and using the scientific method as a decision matrix so that we can have reasonable discussions about requirements and standards and find practical ways to implement them.

BY CREATING CUSTOM TEMPLATES AND FORMATS FOR TOOLS LIKE DOORS, RATIONAL TEAM CONCERT AND RATIONAL QUALITY MANAGER, INFORMATION RELEVANT TO THE PRACTICE OF COMPLETE QUALITY MANAGEMENT CAN BE TRACKED, MEASURED AND LINKED TO OTHER INFORMATION IN THE ENGINEERING MANAGEMENT DOMAIN.

6.0 The IBM-QMI 2QR® Quality Process

The IBM-QMI 2QR Quality Process for customer engagement begins with joint consultations to identify the customer's needs for cultural, process and/or technical improvements. The objective of the consultations is to achieve a collaborative design that fulfills the goals and budget requirements of the customer and can be effectively implemented. Then our IBM-QMI partnership will provide 2QR customizations that upgrade and extend the standard capabilities of the IBM Collaborative

Lifecycle Management platform to enable the management of quality. These customizations can take many forms depending on customer needs. The following are some examples of possible tool usage.

- DOORS NG® to manage not only system and software development requirements, but also more intangible requirements such as service levels, expectations, needs, issues and their reconciliation with accurate records of actions taken
- Rational Team Concert® to manage Quality Management tasks, such as inspections, audits, process checks and real-time status ensuring that development, deployment and maintenance processes are implemented as designed
- Rational Method Composer® to facilitate the design, documentation, tracking and process verification of product development and implementation plans
- Rational Quality Manager® to connect testing results to requirements and needs, enabling better test planning, traceability and root cause analysis. Quality Management procedures such as audits and process checks can also be scripted, implemented and tracked
- Watson IoT Platform® to sense conditions in the deployment environment that affect quality, such as the movement of vehicles, changes in inventory or the re-tasking of people

Templates and Dashboards

The built-in and extensive ability to customize that is inherent in the IBM Collaborative Lifecycle Management tools makes it possible to extend their applicability beyond systems engineering and software development groups. By creating custom templates and formats for tools like DOORS®, Rational Team Concert® and Rational Quality Manager®, information relevant to the practice of Complete Quality Management can be tracked, measured and linked to other information in the engineering management domain.
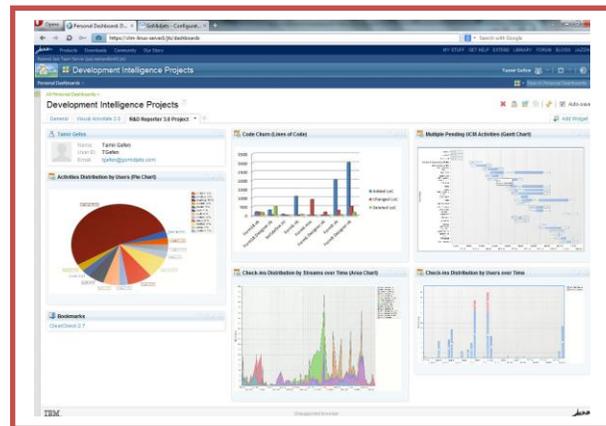
Dashboards can be created to show both summary information from the Collaborative Lifecycle Management platform, such as requirements maturity or artifact rework, and information from other sources such as results from an employee engagement survey. Integrating these sets of information into live dashboards provides a real-time view into the progress and results of Complete Quality Management initiatives.

Training

In addition to customizing and deploying software tools in support of quality, tool-specific training will be provided so that the required cultural values are delivered along with tool-specific coaching and mentoring. Specific customer-related metrics will be developed to determine the viability of the training and its calculated effect using the 2QR Formula for Measuring Success. Following is an example of how we might describe a tool-specific training upgrade.

DOORS NG® - 2QR® Environment

This course provides the foundations and essentials for creating a technical culture with values-based, facts-driven principles to wrap around and support DOORS NG competencies. Designed to advance tool utilization for entry or practitioner level users, the training provides a rationale and methods for creating a reliable development process; one that is supported by the due diligence; rigor and systems thinking that will produce improved outcomes and precise compliance with standards and regulations. DOORS NG - 2QR provides the cognitive fuel to synergize the information management power of the tool and advance the development agendas while fully institutionalizing a supportive culture. In this specially customized, self-paced, online, instructor-facilitated and coached environment, you'll learn time-proven Quality Management principles from the Quality Management Institute faculty along with expert coaching from our IBM software technical specialists.

7.0 The 2QR® Formula for Measuring Success

The 2QR Formula for Measuring Success is the C-Suite's "dream" solution because it brings definition, training solutions and measurable value-additions to the task of developing a work culture that wraps-around and supports competencies.

The formula is based upon data that is readily available to the C-Suite including qualitative factors for engagement (workplace satisfaction) and the quantitative factors related to engagement (productivity and profitability); human resource statistics for turnover and absenteeism; the performance data related to project management (schedule overruns, budget overruns); and the factors related to risk management (mitigation strategies and expense). Based upon the pre-planned and pre-measured factors chosen via the collaborations, we'll provide specific post-test measurements and analysis of the return on investment. Following are the formula's variable descriptions and links to some of the supporting research.

GALLUP ON EMPLOYEE DISENGAGEMENT: 70% OF THE U.S. RESPONDENTS, 84% IN CANADA AND 83% IN THE U.K. SAID THAT THEY WERE EITHER DISENGAGED, ACTIVELY DISENGAGED OR HATE THEIR JOBS.

ROI = (Employee Engagement + HR Statistics + Project Management + Risk Management) / x(2QR)

ROI: is the calculation of the return on investment which is determined by comparing the expense differentials (pre and post training), calculating the cost of quality and then dividing them by x(2QR).

x(2QR): X is the financial investment being made to create a 2QR Environment

Employee Engagement:

Employee Satisfaction: Actively disengaged employees tend to create conflict and poison the work environment.

P*roductivity and Profitability:* an article published in INC.com[17] broke-down a Gallup Poll with data that organizations with high employee engagement have 21% higher productivity and 22% higher profitability

HR Statistics:

Turnover: The American Management Association[18] has reported that the average turnover rate is now 14-19%. Turnover can destroy your enterprise and high-performers expect leaders to create a stable working environment with established policies and a commitment to protecting the organization from turnover-related chaos.

The Center for American Progress[19] found that businesses spend about one-fifth of an employee's annual salary to replace them—20% of the annual salary, benefits, etc. This includes the costs of hiring and training a new employee plus productivity losses.

Absenteeism: Forbes.com[20] references "Absenteeism: The Bottom Line Killer" in its report that unscheduled absenteeism costs roughly $3,600 per year for each hourly worker and $2,650 each year for salaried employees. The INC.com[21] article also stated that organizations with high employee engagement have 25-65% lower turnover and 37% less absenteeism and tardiness.

Project Management:

Schedule and Cost Overruns: Data from the Chaos Manifesto, published by the Standish Group indicates that only 39% of the projects which were guided by Agile concepts were successful as measured by their having reached their budget and schedule objectives. 52% using Agile concepts were challenged while 9% were outright failures. At the same time projects guided by Waterfall concepts were successful only 11% of the time with 60% challenged and 29% outright failing. 52% of all projects reviewed cost 189% of their original estimates and had schedule overruns averaging 70%.

Risk Management:

Precision Strategies: 2QR provides the CFO and legal counsel with a whole new array of risk management options that are supported by prevention science and cost-effective strategies and that are not limited to the guesswork of financial calculations and legal maneuvers that support the typical risk mitigation strategies. Risk assessments and prevention plans can be scientifically calculated and implemented with precision using the tools of systems thinking inherent in 2QR.

8.0 Conclusion and Service Offering

IBM's partnership with the Quality Management Institute provides the leadership, expertise, best practices and tools to guide you in the journey to transform your organization. By combining the capabilities of the IBM Collaborative Lifecycle Management platform with the principles, strategies and processes of Complete Quality Management as expressed in the Quality Management Institute's 2QR Environment we are able to create solutions for more effective client use of the platform and the
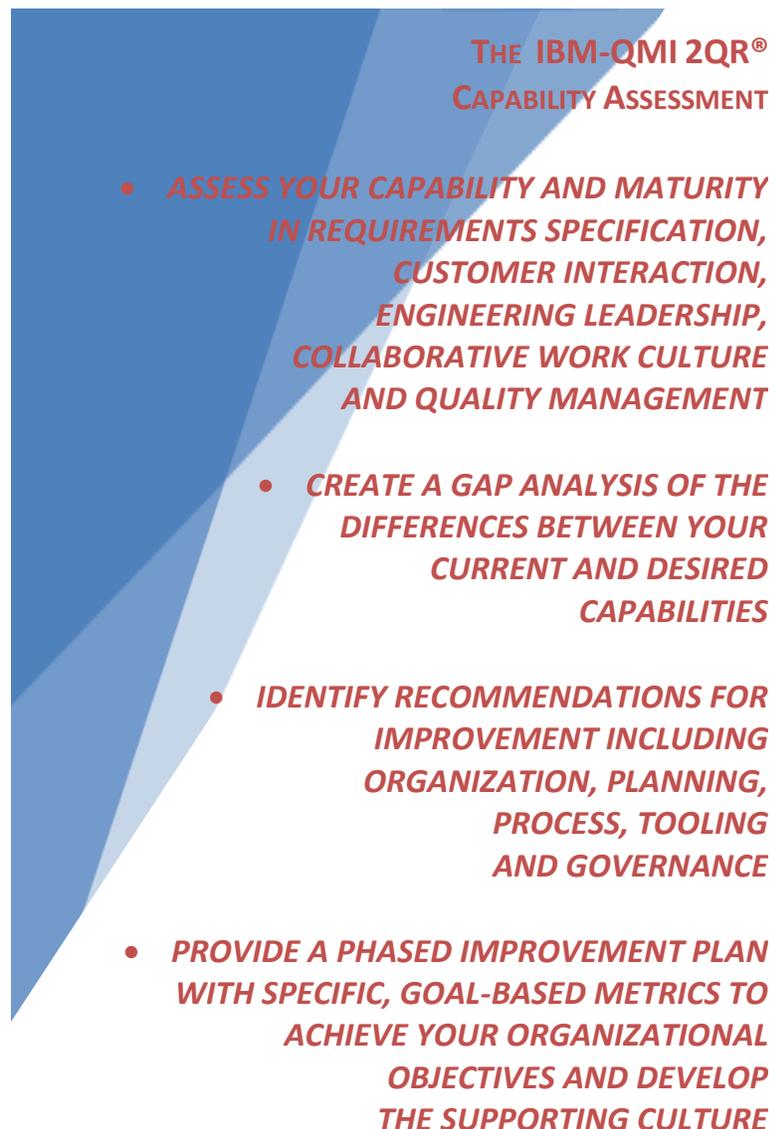
improvement of the supporting culture for software and systems development. For the many reasons discussed above, neither the adoption of Agile and Lean methods nor the deployment of the platform can accomplish for the IBM client what a combined 2QR training, culture, and solution infrastructure provides.

Our joint consultations begin with informal and confidential discussions about your needs for cultural, process and/or technical improvements. Specially designed IBM-QMI Webinars may also be provided as a step toward developing consensus. Should a more formal engagement be prescribed, the IBM-QMI 2QR Capability Assessment will help you identify what changes can maximize your production capabilities. This is done by gathering three distinct kinds of evidence:

- Interviews with your staff to identify their experiences and perspectives; including the development team leadership and various management and production personnel.

- Review of your organizational standards, plans and systems development processes including requirements acquisition, design and configuration management, coding procedures and Quality Management standards and protocols.

- Review of specific project outcomes including conformance to project schedules and budgets, responses to defect reports, test planning and documentation.

IBM has always been "dedicated to every client's success."

Empowering our solutions with the 2QR® Complete Quality Management Environment offered by the IBM-QMI partnership can be a key differentiator in our ability to impact our clients' success.

THE IBM-QMI 2QR® CAPABILITY ASSESSMENT

- *ASSESS YOUR CAPABILITY AND MATURITY IN REQUIREMENTS SPECIFICATION, CUSTOMER INTERACTION, ENGINEERING LEADERSHIP, COLLABORATIVE WORK CULTURE AND QUALITY MANAGEMENT*

- *CREATE A GAP ANALYSIS OF THE DIFFERENCES BETWEEN YOUR CURRENT AND DESIRED CAPABILITIES*

- *IDENTIFY RECOMMENDATIONS FOR IMPROVEMENT INCLUDING ORGANIZATION, PLANNING, PROCESS, TOOLING AND GOVERNANCE*

- *PROVIDE A PHASED IMPROVEMENT PLAN WITH SPECIFIC, GOAL-BASED METRICS TO ACHIEVE YOUR ORGANIZATIONAL OBJECTIVES AND DEVELOP THE SUPPORTING CULTURE*

14

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