

The Business Value of Quality and Testing

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The most important objective for any leader in charge of verification, testing, or the ultimate goal of quality is to save the business – nothing short of this – it is protecting the brand. To do this, you must successfully convince the rest of the company how important it is to do just one thing, one thing too often overlooked: make software that works. And, for all of the emphasis we typically place on automation tools, and development methodologies, and defect curves, the end quality of software often depends far more on intangibles. It is vital to speak to and listen to customers. It is critical to have processes in place. But perhaps supremely, unless the entire company understands the value of providing working products, customers will ultimately abandon your products to use those of your competitors.

For years it has been unspoken but acceptable practice to pay lip-service to Quality, to nominally tout the inherent value of Total Quality Management or its latest variation; too often such pursuits have dominated our marketing literature and dialogue, though, rather than actually influencing our deliverables. In practice, initiatives focused on ISO certification, or security practices, or adequate funding for three-dimensional verification and user documentation have been supplanted by a lust for new technology and new features and for technological revolution, rather than the mundane delivery of code that does what we say it will.

We are moving into a far tougher business climate, and not simply owing to the effects of the economy. Our clients are ever more demanding, insisting that the same high level of expectation they have for quality in their cars or in their video games should be on obvious and abundant display in our business software – for which they sometimes pay far more. Hard decisions must be made every day to scrap new ideas that only a few years ago would have inspired the creation of a new business unit, in order to instead adequately fund the well-rounded development of current projects. In the midst of this new atmosphere, the Quality manager must become an *effective* evangelist for Quality,

not just a manager, and must be imbued with sufficient authority and leverage to drive meaningful change.

The position is still in some circles conceived of as one where process-minded theoreticians can conduct testing like scientific research. Today, whether the expectation is spoken or not, the Quality manager must take Quality to the troops. This means not just following process, as important as that is, but also in understanding and communicating the real benefits of that process: often in terms of revenue, and sales wins, and client retention. There can be no sacred cows; it may well require streamlining the procedural steps that provide low value in order to do more of those that demonstrate a clear connection to customer usage, or even new sales opportunities. The correction for low product quality is not a bloated Quality Assurance organization, but rather, one that is lean, and especially, aggressive, pushing the mindset of Quality into all phases of the product marketing and development life cycle.

Step One: Moving from Critics to Consultants

The first step to becoming this kind of Quality leader necessitates a personal decision, but is one of the essential intangibles we began with. You and your extended teams must decide to transition from critics to consultants. The role of the critic is effortless. All it takes is a finger and a problem to point at. As a critic, you can be the siren for every little problem with the products you test. You can piously complain and say, “I told you so”. You can pass judgment every time a corner is cut and argue with self-righteous indignation because you have Quality on your side.

Instead, let’s get real. Producing high-quality software is incredibly hard work. To paraphrase Steve Martin’s recent comments at the Academy Awards, “I’m willing to do anything to look good, except for eating right or exercising.” Regrettably, the exercises begin now:

Exercise #1

Record below three examples where you have behaved like a critic. You were probably justified: product Quality was being compromised, corners were being cut, and you could see the train wreck coming. It's just important to notice our own patterns as a critic because we are going to work to change them.

1. _____

2. _____

3. _____

Now try to imagine yourself handling these same situations as a consultant. Instead of having only two options when facing a severe problem, escalating or relenting, you can put the problem in the context of the business. Because you understand customers and work with them every day, you can give specific, concrete examples of business and opportunity this problem can jeopardize. But you can also see the big picture and communicate the need to make decisions. This means that you don't simply complain, you offer business analysis and alternatives on a wide range of issues. And instead of judging the product or feature as good or bad, you can identify risk scenarios. You become an advisor to your executive community. And because you do not force yourself into a corner with a right versus wrong argument, you create an atmosphere where new alternatives can potentially emerge. The lesson for each of us (the authors included): business decisions should be based on the best available data, along with insight into the potential impacts of the alternatives being considered. It must never be personal. It is so

easily to become emotionally attached to our projects, if we are at all passionate about the work we do!

Exercise #2

Think of three ways you can start being a consultant today. What are the latest business trends moving through your company? Are you aware of the significant literature in your field? How can you tie your efforts to communicating new possibilities?

1. _____

2. _____

3. _____

Step Two: Tying Return on Investment to Quality Initiatives

It's rare we think about the oil in our car, unless a commercial is nagging us to get our oil changed or is hawking a particular brand. And, oil doesn't even cost much. No car dealer sells their cars based on the fact that their cars have oil in them. Some organizations similarly run the risk of undervaluing the teams that are functioning to drive Quality into their products, and fail to consider the fundamental business benefits they provide. The result in our software is oftentimes the rough equivalent of a blown engine. There are lemon laws for a reason!

As such, the next step in the process is to understand the key element of all viable businesses: return on investment. Begin to think concretely in terms of the return you are providing the business in exchange for the investment made in salaries, equipment, and other resources spent on your team and on your projects. The larger the company, the easier it is to forget that salaries and the attached overhead they carry are an investment like every other kind of expense. Quantifying as much as possible with regard to expenditures and benefits is essential. Simply performing the same job year after year while increasing salaries and related costs can be perceived as a negative return – and the next time your car is built, no one will think it needs oil!

Exercise #3

What is the average annual salary increase in your area, in percent or dollars?

What is the annual cost of equipment in your area?

What is the annual cost of other significant expenditures (e.g. consultants, software, tools, project management, etc.)?

When was the last time that your area of the business was directly involved in a sales situation? How much was the sale for?

Clearly, the more detailed the analysis you can perform, the more accurate your findings will be. At a high-level, though, for the purposes of this exercise, these are likely the big rocks to be moved.

First we will focus on the “return” part of the equation. Organizations that are involved in Quality Assurance often – regularly – miss this essential ingredient: the key to

understanding and communicating the value you bring to the business is via direct customer interaction. Client interaction is not of value only to sales and support. Your approach must include customer visits that give you information about your business and how your products are really used. With enough of this interaction, you will find customers that have problems you can actually solve or get them help with. Over time, as you begin to change your products based on these interactions, you will see a difference in the feedback you get from customers. At the beginning, you may have to hear exclusively negative comments. You will likely have to bring bad news back to executives and others – but there is no arguing with client feedback.

To begin with, you can use this feedback as motivation to implement the changes that you see need to be made. Very often, even significant business decisions are made not with hard facts but with strong arguments – and often they completely lack a client perspective. It is amazing how saying, “I met with Client A, and they said...” will often bring clarity. It may appear that all the feedback we bring back is negative initially, but with enough interaction you can learn the most important question to ask a customer when all they have is complaints: *“So what is working for you?”*

The answer to this question is always surprising. Remember, back in the distant past, when you used to be a critic? Remember how easy it was to be critical? Customers can fall into this same rut. Often they have received formal education on how to manage vendors, that teaches them how to critique us even more expertly! They may go on and on about problems as though that is all they ever encounter. However, it is important to take a deep breath and remember that they wouldn't keep your software if they only had problems. When you ask the question, “So what is working for you?” you force them out of the cycle of criticism. They have to take a step back and remember why they use the software at all. Now, it's unlikely that a customer will suddenly stop complaining and sing the praises of your software. However, it *is* likely that they will pause long enough to give you valuable insight into what they consider the most important positive aspects of your software. If a customer says, “Product A is great. We never have to touch it after we install it.” This statement says that they care more about reliability than new features

(or even very likely the complexity of installation). If a customer says something like, “we really like the new features in Product B,” then you know what they value most, and can convey that within your company along with the feedback of other clients.

Exercise #4

Think of three customers that are key to your company. Think hard if you need to!

1. _____
2. _____
3. _____

How can you get into direct contact with these customers to understand how they use your products?

One of the greatest challenges we have seen for organizations associated with Quality is centered on this problem: “Ok, I know that direct involvement with clients will radically change the way we do business and our ability to influence decision-making. But how do I get started?” Most software products are capable of gathering some form of serviceability information from clients. In other instances, they produce databases that can be brought back to our verification labs, or environmental and configuration information, or countless other forms of information that can make our testing more effective. Often, asking the teams that provide support and services to our clients yields contacts: “Which three clients are having the most difficulty with our software? Is there any way you think our teams can help?”

Exercise #5

Think of how this desire to better mirror client environments can expand. We have, for example, taken this approach to the next level. We have identified specific components for a product that can be transplanted directly into our test environments. As an example,

we have a product that receives events and uses rules to automatically respond. The component that contains the rules is called a rulebase. We discovered that these rulebases could be used interchangeably. So instead of just testing a product on the same versions as our customers, we can use their actual data. We can test upgrades and actual operation in our labs with the actual customer configuration that will use it in the field, and by consequence, experience all of the specific issues they may see or understand the benefits more precisely. We have another product that has an interchangeable database. Because of frequent client interaction by our teams, we have these databases for many varied clients, and now the general release of this product to the market is contingent upon being able to migrate actual client databases effortlessly from one version to the next.

Think of any products you have that could accept data, or configurations, or environmental, or any other information directly from customers. If you have a product that can be customized with scripts, can you get these from customers? What about logfiles that tell you exactly what actions have been performed by a customer?

Quality Conspiracy

Once you are leading the charge, you will find that you have promoters – unexpected advocates for Quality – across the company. They have been waiting for you to arrive on the scene. These people will provide you with data that will reinforce your perceptions of Quality. And later, after you have begun to demonstrate measurable results, they will provide additional data to confirm your achievements. Our Support organization provided some of the best data that we could use to justify finding defects earlier in our product development life cycle. They identified and carefully quantified the relative cost of removing defects early in the release cycle, and drew comparisons to the costs they were expending later as issues were uncovered by clients. Thanks to their data, we were able to identify the most difficult customer situations, and act to resolve them before

these issues ever made it into the next version of our products or into the hands of our clients. We were able to make a complete turnaround in the profile of our customers from a perspective of these situations. Using data like problem reports, defect arrivals, or customer satisfaction metrics, validate your approach by tracking these metrics.

Take careful note: some verification teams are functionally almost entirely passive. In other words, they wait to receive a testable version of a software release, and then respond with defects. Many studies have shown, though, that the more defects you find in late phase verification, the more defects you will see in your client's shops. The objective is not finding bugs. The objective is driving quality as early in the life cycle as possible. And there are many allies for this mission.

Exercise #6

What other areas of the company can help you spread your message? What contacts do you have that you can engage to collect data on the current state of your products and customers?

Once you have identified the problems, executed on a plan to resolve them, and obtained your results, you can communicate to appropriate levels of management. But it is true that sometimes how you say something is as important as what you say. Instead of the "Costs" attributed with your staff and equipment, communicate more accurately that these are investments in residual revenue. After all, if you don't drive quality into existing products, how will those customers be convinced to buy more of your products? Your "Test Effort" can be converted into "Industry Best-Practice Staffing Ratios". And while new features may occupy the attention of most of your company, you can help to highlight the client desirables for priorities like "Ease of Use" and "Time to Value".

Step three: Rational Investment

The problem faced by every leader in the software business today is a shortage of resources. It always seems like funding battles are one-sided. Funding is often determined by a manager in charge of developing or marketing the product. Since new features are the focus, resources have to come from somewhere. And, the theory goes, if the new features don't work exactly like they're supposed to, customers will understand and wait for a future release for them to work right. As a result, teams devoted to Quality are often perceived as wandering sadly from group to group, peddling pencils, their little tin cup outstretched.

In the current economy, it's next to impossible for anyone to get additional staffing for anything. Trying to get Quality headcount in this environment is almost impossible. One of our most successful efforts at teaming has been to involve our entire management team in a collaborative discussion of industry-standard staffing ratios.

First, we did a great deal of research on how other development teams staff their test resources. We found several excellent examples of how Quality investment paid off. For instance, did you ever use Lotus 1-2-3 in its very early days? We found a source that stated that Lotus committed 66% of its development staff to testing. Probably the most sobering datapoint we found was an example from the aerospace industry. In that industry, defects cost lives, not just dissatisfaction. So what does it cost to eliminate all defects? Components of this industry think that it's worth investing 90% of its development resources in testing. Until you have that datapoint, it's possible to believe that improving your test process can get you there. But don't be misled, because when defects cost lives, it takes a 90% ratio of staff dedicated to Quality and test activities.

Further, we took these various sources of data and identified appropriate ratios to accomplish the quality goals that we as a management team had set. We pulled together the same analysis for our documentation staffing, a function we believe has a critical role in client experience and Quality. We researched recommended levels where available,

and found comparatively fewer data sources, but still were able to obtain valuable data points. Based on these findings, our final proposal was that a standard of 28% of funding of staff dedicated to verification and 10% for documentation was appropriate. We chose these levels because they were at the low end of the industry averages our research had uncovered – and we wanted to be able to maintain accurately that we were still “lean and mean.” With clear data, we were able to take actions and rectify imbalances across a very large part of the organization.

Conclusion

Business transformation is a journey, not a data point. Quality cannot be an emphasis or a program, it must be a non-negotiable. Every time someone makes a decision to ship a product owing to market pressures, or individual client pressures, or worst – internal schedule pressures (and even bonuses), behaviors are reinforced that minimize revenue.

Many of the suggestions made in this paper are atypical emphases for projects and teams focused on Quality. Our view is that the cost/benefit recommendations and ratio work we have offered is the kind of information that others can easily assimilate and use to alter organizations based on the data. But without fundamental changes in the organization, changes that rise from organizational attitudes with regard to Quality and from extensive client interaction, product quality will likely remain only minimally affected.

What differentiates the approach we are recommending is that it emphasizes elements of the overall Quality story that are characteristically ignored. We look forward to seeing an increasing emphasis, particularly on client interaction, in future conferences where Quality is a prominent element. We ourselves will continue to aggregate hard data along the way as we continue to refine our methods, and hopefully, to persuade others. The two workbooks that have been provided separately are tools that can be used to help you move quickly in this same direction.