Trends in Sourcing Software Testers and QA Professionals – Moving From Outsourcing to Co-Sourcing

An Executive Report by

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Abstract

Since the mid-1990's, many software development roles such as developers, testers, business analysts and others have been increasingly filled by offshore resources. In fact, this trend has also been seen in call centers and many other industries. The offshore global software application testing market alone is projected to grow at a rate of 11% between 2017 and 2023, reaching a total predicted market size of $48 Billion USD by 2023.[1]

The software testing services industry is in the middle of a tsunami of growth fueled by a variety of major forces such as:

- New technologies, such as the Internet of Things (IoT) and mobile applications
- Digital transformation of aging legacy systems
- Big Data used by organizations (corporate, governmental and political) to drive user analytics
- Major cybersecurity investments

Each new application developed or modernized has a high need for testing by competent people who have:

- ***Strong knowledge of testing and application development***
- ***Strong team working skills***
- ***The ability to provide customers with fast and accurate test results***

In the last twenty or more years, offshore outsourcing has been a quick and easy way to fill staffing gaps, especially in software testing and QA. However, merely outsourcing testing tasks has been shown to have significant drawbacks, such as:

- Lack of transparency as to the work being performed, who is doing the work, and how proprietary content is being safeguarded
- Lack of testing training and competency
- Lack of critical thinking on the part of the testers
- Little sense of teamwork between the customer company and outsourcer company (offshore or near-shore)
- Lower overall value of the work due to fewer defects found and less valuable information about the software being tested
- Uncertain and unpredictable outcomes from the testing effort

[1] Market Research Future analysis - https://www.marketresearchfuture.com/sample%5frequest/4645

- Communication problems between the customer company and the outsourcing company

In this paper, we will explore a new model of sourcing called "co-sourcing", along with the process, outcome and economic advantages to this model.

Benefits of Independent Testing

There are clear benefits to independent testing given the right success factors, such as:

- Adequate documentation for the independent tester to access about the item(s) being tested.
- Good communication with the sending party
- A strong sense of responsibility by the sending party (developers)
- The ability of the development organization to accept objective information concerning product defects
- Detailed information provided to the development group on all failures and issues identified as quickly as possible
- Developers acting as quickly as possible to correct defects in order to enable confirmation and regression testing

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The ideal role of independent testing is to provide a perspective of the product that internal developers and/or testers simply do not have due to various biases. This problem of non-objectivity has been shown to be increased on many agile projects where testers have been embedded in the development teams. The goal of embedding testers is to have faster feedback to developers concerning defects. In reality, embedded testers often start to see things the same as developers and miss the user perspective of defects.

Flaws in the "Throw it Over the Wall" Approach

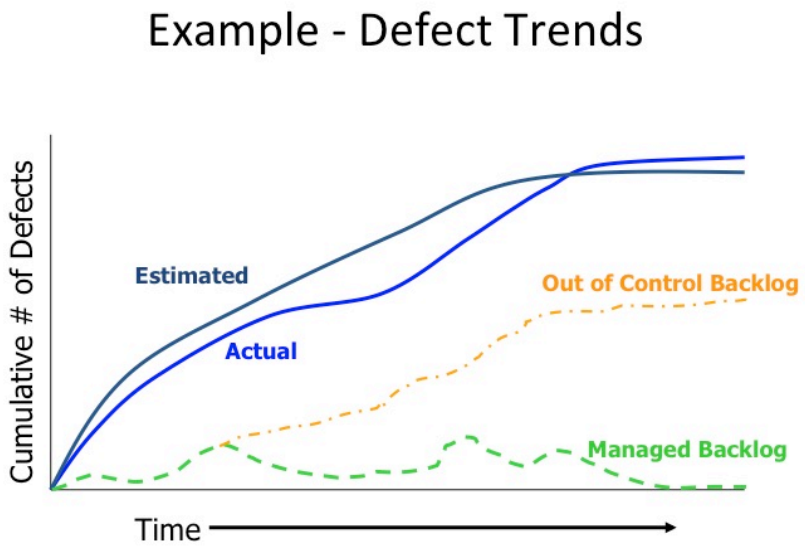
Simply handing off an application to another group for testing, either internal or external to the organization, (also known as the "Throw it over the wall" approach) without consideration of the above success factors is often a flawed approach. The typical result is that work goes

back and forth between teams many times as defects are found and fixed. In this approach, many cycles of testing may be needed to reach a point of sufficiently low defects and high confidence in the software.

This is not to say that cycles of test, report, fix and re-testing are not needed. Rather, it is when those cycles of testing become excessive that the additional time and work, with resulting increased cost, are seen.

In passing work to an independent test team, the key test of quality is what gets passed back to the customer. The lower the quality of work being sent to testers, the more defects will be found faster by the testers.

At first, finding many defects quickly could be seen as a good thing. Instead, it is indicative of software not ready for testing by people other than developers. In addition, finding too many defects too soon can actually be an indicator of problems that no amount of testing can fix.



The impact of finding many defects early is that the developers get overwhelmed with defect reports and often have difficulty fixing the defects. Meanwhile, the testers keep finding even more defects, which increases the defect backlog. Soon, the ever-increasing defect backlog (shown by the orange dotted line) becomes a risk factor since all the

related features will need to be tested, both at a confirmation test level and a regression test level.[2]

The key to remember is that while independent testing may have greater objectivity, it doesn't always result in better testing – only if the risks are managed well, as seen in the co-sourced test approach.

There is a Better Way – Co-sourcing With The Whole Team Approach

Testing should be a "whole team" activity. Everyone on a project (developers, users, testers, management, and others) has a role in testing whether they realize it or not. When testing is seen as just one team's job, some aspects of testing will be incomplete.[3]

Co-sourcing has emerged as a solution. It involves independent testers in a way that brings the whole team approach closer to a company than traditional outsourcing. This is achieved by close communication with the co-sourcing team, led by an on-shore testing expert.

In response to the challenge of diminishing returns from traditional outsourced test delivery (the mere execution of tests and reports without analysis), the co-sourcing model is based on Dedicated Product Test Teams.

It is obvious that more eyes catch more defects, but more than that, effective teamwork creates value greater than the sum of its parts. This is achieved by building and sustaining a collaborative culture conducive to critical thinking, questioning and clear communication.

Instead of having ten individual testers designing and conducting tests, consider a team of ten people critically thinking about the application, brainstorming, designing and performing tests and providing feedback – all led by highly experienced test leaders.

The co-sourced teams all receive high levels of training conducted by industry experts in areas such as:

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[2] Confirmation testing is testing done to confirm a defect has been fixed correctly. Regression tests are performed to make sure functions that are unchanged still work correctly as before the changes were made.

[3] Perry and Rice, Surviving the Top Ten Challenges of Software Testing, Wiley

- Software testing based on the ISTQB Certified Foundation Level (CTFL) certification
- Proficiency in Agile methodologies
- Project management
- Testing tools and automation

One key ingredient to building the most effective global tech teams is the leadership role women can bring to the effort. In the actual co-sourcing projects I have studied based in Rwanda, the woman-based teams have demonstrated:

- High levels of co-operative work
- Reduced risk
- Scalability
- Qualitative difference in thinking, as compared to simply hiring a group of individual testers with varying skill sets who may or may not work well together

The combined result is one of higher economic benefit, greater test effectiveness (more significant defects found), and better information for stakeholders to make informed decisions.

The Problem with In-house Teams

A major issue with in-house teams that few people mention is that 70% of team members across all industries and roles in most companies are disengaged in their work.[4] According to a recent Gallup *State of the Global Workplace* report, **85% of employees are not engaged or actively disengaged at work.** The economic consequences of this global "norm" are approximately $7 trillion in lost productivity. This is not the fault of the people, but rather the result of organizations that fail to build engagement.[5]

The majority of testers in teams (both agile and traditional) are not working up to their potential for the following reasons:

- They dislike their leader or manager
- They are assigned work that is not challenging
- They are not empowered
- They are micro-managed
- They get little recognition or praise for their efforts when they do excel
- They lack ownership in the testing process

[4] *Shift the Work*, Joe Mechlinski
[5] *Out of the Crisis*, Dr. W. Edwards Deming

- Their input is not solicited or considered
- Human factors (such as feelings) are not valued
- Investment in growth is not made by the company
- They are distracted by other projects
- They are overworked and stretched too thin

By contrast, the co-sourced team I observed in Rwanda:

- Love their leader or manager
- Meet testing challenges with enthusiasm
- Are highly empowered
- They are led and supported, not micro-managed
- Get significant recognition or praise for their efforts when they do excel
- They have a high level of ownership in the testing process
- Their input is solicited and considered
- Human factors (such as feelings) are valued
- Investment in growth is made by the company
- They are not distracted by other projects
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Certainly, not all in-house teams are highly disengaged. However, in surveying over 5,000 testers, my research shows that disengagement is the norm. If given a better opportunity, many testers would be motivated to make the move to another company.

This means that a particular in-house test team may not be as productive, effective, or happy as management thinks.

Where disengagement is high, interest is low. People tend to not invest in their own development because of the overall lack of motivation. This translates into lesser effective testing and lower quality software.

This paper is not advocating the elimination of in-house test teams, but encourages leadership to rise to the challenge of investing in the teams to increase engagement. Co-sourcing can be a catalyst for improving the performance of an in-house team by engaging with in-house teams and adding the influence of an on-shore testing expert.

Good Communication is Critical to Good Testing

The co-sourcing model is a great improvement to the communication challenges associated with traditional outsourcing models. The low level of communication often seen in the traditional outsourcing model

can introduce the risk of actually generating defects rather than removing them.

Deep understanding of client requirements and the capacity to translate them into excellent test execution means investment in the highest caliber of leaders. But this is more than just hiring an individual or superhero tech team behind it. This also builds trust into the relationship.

A key underpinning of Agile methods is frequent communication between team members and with stakeholders. Communication must be designed to embrace remote workers as well as those in the same physical space.

The trend is clearly toward three major things – 1) Remote workers are becoming more and more acceptable and relied upon on projects, 2) Improved technology has improved and enables instant communication around the world with minimal investment, and 3) Time differences hold advantages in that testing can be performed in the off-hours of North American time.

Talent Acquisition

Finding the right people for the right testing roles is the essence of any sourcing effort. Finding the right in-house talent, however, can be costly and time-consuming. The average cost-per-hire is $4,129, while the average time it takes to fill a given position is 42 days (59 days for engineering level positions), according to the Society for Human Resource Management's (SHRM's) Human Capital Benchmarking Report.[6] During that time, one can expect to spend about 35 hours of interviewing per person hired.

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The clear trend is for companies to post job openings for testers with fifteen or more skills required. This takes the form of a skills "wish list". Some of the requirements are highly technical, which make it almost impossible to find the complete skill set in one person. This also adds time and expense to talent acquisition. In co-sourcing, a full set

[6] https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/2016-Human-Capital-Report.pdf

of testing skills, including technical skills, are customized to meet client needs. These skills are found in the collective team as opposed to each individual on the team.

In addition, on-boarding the person can take even longer when training is considered. One company in my research requires several weeks of training and several more weeks of shadowing other workers before they are allowed to touch a line of code. Reducing the hiring and onboarding time is one reason outsourcing has become so popular. However, this can be a risky proposition. It may take weeks to learn that the people actually doing the testing are not the same ones *thought* to be doing the testing.

Then, there is the tester turnover rate. After all the time, money and effort expended, the average employee tenure is eight years, the annual turnover rate is 19 percent and the involuntary turnover rate is 8 percent.[7] In the co-sourcing model, turnover is extremely low due to loyalty of testers to the co-sourcing companies.
In the co-sourcing model, project and technical talent are matched where the client needs it, as well as co-leadership on the ground were the team is located. The immediacy of presence enables:

- Real-time communication with and integrated participation in client project updates
- Greatly reduces the pain and suffering of communication risk that project managers are typically expected to work with using offshore teams (communicating during early mornings, late evenings or on weekends)

In the co-sourcing model, a dedicated North American testing expert is available to communicate during normal office hours. This enables the time-shifting benefits of offshore testing to be realized.

With co-sourcing, the hiring and training burden is virtually eliminated, which allows a team to start and be effective in days instead of months.

Starting From a Blank Slate of Testing Resources

In situations where no testing capability is in place, additional testing resources are needed, or testing is simply not working well, outsourcing is seen as the way to go. However, what is often missed in

[7] https://www.shrm.org/hr-today/trends-and-forecasting/research-and-surveys/Documents/2016-Human-Capital-Report.pdf

traditional outsourcing is the human and process integration with the customer organization. A well-planned effort is needed to effectively start working with the outsourced organization.

The planning needs to include, at a minimum:

- Which domain knowledge is needed by testers?
- Which application knowledge is needed by testers?
- The testing process to be used
    - This includes how tests are designed and performed
- The reporting process to be used
    - Which information is needed?
    - How is the information reported?
    - When is the information reported?
    - Who is the audience?
- The tools to be used and how they should be used
- How and when will communication occur?

Co-sourcing facilitates and accelerates the testing start-up effort by providing strong up-front expertise, often at the customer location. The North American consultant comes on-site to meet with your teams to create the test plan, which includes the start-up plan. Because of the deep expertise brought in at the outset along with the strong working relationship with the co-sourced team, the start-up time is greatly reduced and the test effectiveness is increased.

It typically takes at least six months for an organization to hire, on-board and train a small test team of five people or fewer. It often takes years to mature such as team so they actually function as a team, have significant application and domain expertise, apply tools intelligently, and develop synergy with users and developers.

For larger teams or ten or more people, the time to build out the team and see them mature into fully-functioning teams may take over a year, depending on the domain and the people.

Co-sourcing can bring a mature well-functioning team to projects in less than a month. In many cases, testing can begin in as little as two weeks. This makes co-sourcing an attractive alternative for companies without the needed testing expertise and resources for the project at hand.

Dynamic Learning

A key issue with independent testing is for the testers to climb the learning curve of the products under test. To effectively test an application, the testers must understand it first. Many times, this understanding also extends to the business or other functional domain.

In response to the exponential rate of growth of skills and competencies the industry requires, an important element of co-sourcing is the Dynamic Learning model.

In the dynamic model, the intellectual investment is not in fixed individual talent assets that can leave the services company at any time, but rather team capacities that evolve and grow with needs.

The dynamic learning model is essential to keep pace with the extension and expansion of work in today's projects. These needs often include the adaptation to new tools, the augmentation of in-house coding and testing talent as a function primarily of dynamic learning.

Many organizations today expect testers to come into the job fully trained, whether the testers are full-time hires, or from external organizations. This has been a major shift from traditional expectations where a company pays for training on the skills needed to perform a job.

As a result, client-driven and ongoing learning is a deliverable of co-sourcing. It is a part of the work that greatly reduces the need for costly and repetitive talent acquisition. Co-sourcing promotes learning not only for the project at hand but for future projects, to avoid long learning curves.

It's More Than the Money

The initial allure of technical outsourcing was the low cost of labor. However, that low wage cost has continued to increase and now the hourly rate is significantly higher due to high turnover in the outsourcing firms.

What is more apparent are the ancillary costs of leading teams, dealing with Human Resources issues between employees, and the risks of losing key personnel at critical times during a project.

For many organizations, outsourcing testing was a way for senior management to get rid of a pain point in their projects – namely,

testing. The decision wasn't so much about the quality, cost or even speed of testing – it was driven by the desire to transfer risk by having someone else do it. It's much like the decision to have someone else do your yard work. As long as the lawn looks good and the price is reasonable, and the people are dependable, everything is good. One less thing to worry about or work on.

A finding based on the experience of many companies who have attempted outsourcing is that the lowest hourly rate is a risk to be avoided. Reports from companies who have negative outsourcing experiences indicate that low hourly rates are used to lure business, then in the short term, rates increase and team members change.

In addition, low hourly rates often translate to low skills. This is especially true in competencies such as critical thinking, test design, test execution, and defect analysis and reporting.

All of this has led to a lack of perceived value in many outsourcing projects, which has in turn led to companies rethinking their decision. In some cases, companies have brought the outsourced services back in-house.

The co-sourced projects I have researched provide high value for a reasonable cost, especially when the on-shore test leadership adds consulting value to the project. Because co-sourced teams tend to be more cohesive than traditional outsourced companies, the turnover rate is much lower.

The True Value of Software Testing

Many companies have difficulty quantifying the value of software testing. Therefore, they also have difficulty sourcing testing services because price has traditionally been the driving force behind sourcing decisions.

Until an organization is able to compute and realize the value of testing in their specific business and context, all test approaches may seem equal – at first.

The value of testing can be seen in many ways, such as:

- The value of defects found before software release
- The perspective gained by an independent and objective test team

- The value of increased customers and profit due to software that works reliably well upon release
- Regulatory compliance, in regulated industries
- Due diligence in legal cases
- Reduced fines in the event of cybersecurity breaches

The team-based co-sourcing approach has been shown to have added value to organizations by having:

- Multiple perspectives of the product under test
- Expert-level test consultation expertise
- Higher levels of communication due to native English team leads
- Less extreme time-syncing for teleconference meetings, which increases productivity in the organization
- Full transparency into the progress of testing, using the same tool(s) as the organization.

As a benchmark reference, the average cost to fix a post-production defect in the USA ranges from approximately $500 to $4,500 per defect, depending on the impact of the defect.[8] This is largely due to the ripple effect of post-release defects on other items that also need to be fixed. It should be noted this is an average cost, with some defects lower, and some much higher by magnitudes of millions of dollars.[9]

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The value of testing in an organization can be greatly increased by first determining which test activities should be performed in-house and which should be sourced. When this analysis is conducted with expert guidance at the outset of a co-sourcing engagement, the effectiveness and efficiency of testing can be increased by ten times or higher.

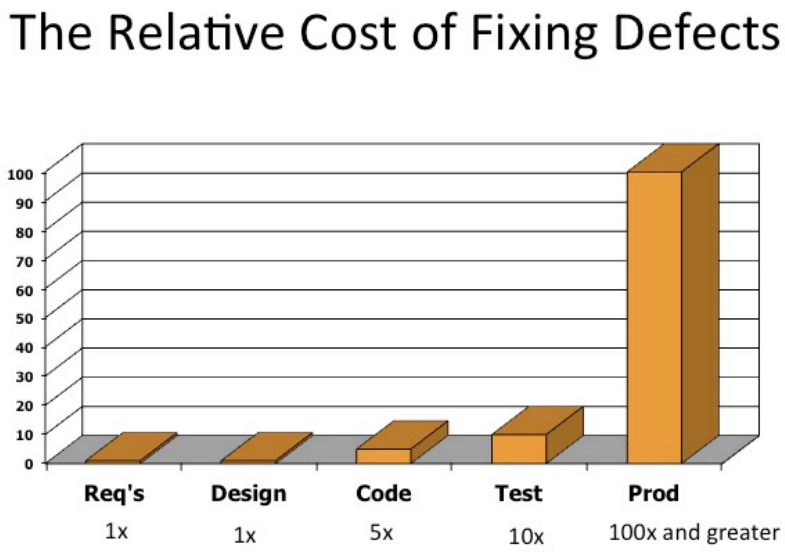
If an independent test team, such as a co-sourced team, finds only 15 major defects in one month (which is a conservative estimate), the value of those discovered defects is around $75,000 (assuming $5,000 per post-release defect) if those defects were not found prior to release, not to mention the intangibles such as the prevention of

[8] Capers Jones warns about the assumptions with the "cost per defect" metric in his paper, "The Mess of Software Metrics", March 2017

[9] As seen in the 2012 NASDAQ Facebook IPO failure.

damaged reputation. This one value calculation alone more than pays for the testing services.

In reality, our experience is that co-sourcing often finds many more defects that this, in the spectrum from minor to major severity, all of which carry significant cost and risk.



Based on the well-researched cost factors of finding defects early, the earlier a co-sourcing team can start testing, the better. As seen in this chart based on the work of Dr. Barry Boehm and others over the last 40 years, the cost to find and fix defect rise dramatically toward the end of the project and especially after the software is released.

Manual Testing is Dead – Or Is It?

There is much discussion about the rise of test automation, even to the point that to many people, the assumption is that manual testing has no future and no value.

However, consider:

- How many companies actually apply test automation well?
- How many applications are not worth the high investment in test automation?

- The types of tests than should not be automated, such as usability and validation tests
- Applications that have functions for which tests can be automated
- The high degree of tool and vendor churn
- Testing and test automation are different skill sets

A paradox exists here. On one hand, test automation is very helpful if done right. On the other hand, manual testing is still needed to get important perspectives of testing.

Co-sourcing can provide solutions for both the tedious job of creating test automation as well as the creative (and sometimes, tedious) job of manual testing.

In addition, there are aspects of test automation maintenance that are tedious and burdensome, which can also be co-sourced.

The Right Test Approaches Make All the Difference

In 2015, Capers Jones conducted a study of what results in the most effective testing, as judged by the percentage of defects found by testers vs. defects found by everyone, including customers. He found that certified testers using coverage metrics (% code statements tested, % decision statements tested, % requirements tested, etc.) of the item(s) under test yielded a high percentage of defect removal efficiency – 98% and higher.[10]

My research concurs with this finding. In addition, my research also shows that when a customer organization is not clear on the people performing the testing (either as a team, or as individuals), and the approach and process applied in testing, then the Defect Detection Percentage (DDP) is much lower. This is due to the "black box" nature of the testing process itself (not the use of black box test techniques).

Co-sourcing allows the customer to see and control critical aspects of testing before, during and after the test, including defining:

- The purpose of the test
- The main goal of the test
- The major test objectives
- The critical success factors for the product under test

[10] "Software Quality State of the Art, 2015, Capers Jones

- The most workable test approach and strategy
- A workable test plan

The above items frame the testing effort.

In many projects, the final result of product quality is never visualized or articulated. Therefore, the results of testing may leave stakeholders with unanswered questions and lowered confidence in the product under test.

Dr. Michael Pucci, Education Innovation Director of Muraho Technologies, states:

> *"The "right to left" approach means that we start with quality assurance as the end in mind and align the testing process with client priorities every step of the way. Because we are thinking first of outcomes and prioritizing what is mission critical, we quickly become critical, valued members of the software development process and team, adding real value to your goals of product excellence, risk management, and speed to market."*

For any testing effort to be successful, three areas must be in balance: Process, People and Tools. If any one of these areas is not performing well, the entire testing effort will be inefficient and lack delivering the information needed by stakeholders.

Concerning the mix of people, process and tools, Dr. Pucci states:

> *"Appropriate software testing tools and processes are employed according to each project's specific needs, ensuring the best means to achieve industry standards of functionality, performance, reliability, stability, security, compatibility, and usability. This includes application of manual and automated testing to facilitate repetition and regression and continuous testing. "*

For any testing effort to be successful, three areas must be in balance: Process, People and Tools.

Co-sourcing delivers the ability to not only define the key aspects of a testing project from the start, with the end in mind, but also the visibility into the process and outcomes to make adjustments where and when they are needed. Co-sourcing allows a customer to work with a testing expert in the customer's country, speaking native

English, to communicate with the test team and to provide expert consulting guidance.

Measureable Results

To realize value from any testing effort, there must be a way to quantify the effectiveness of testing. This includes other important aspects such as time and resources used in testing, the testing budget consumed and risks.

For sourced testing of any type, a real-time dashboard is the de-facto standard in gaining visibility into testing efforts.

Each testing project will have its own set of important metrics to monitor, but it is important to understand that with metrics, less is often more. Too many metrics get confusing, but with the right metrics most of the needed information to assess and guide testing efforts can be obtained.

As an industry standard way to measure scope, function points[11] is a solid choice because they are not dependent on any particular coding language, yet provide an accurate sizing measure. In addition, a rich set of industry practices and benchmark metrics are available based on function points to judge relative scope, resources, defects, progress and quality of testing. These can also be used to estimate the number of co-sourced testers that are needed for a project.

Co-sourcing can provide the metrics you need to be compatible with existing measurements and metrics already being captured and monitored by an organization, whether based in function points or not.

[11] Function points are a measure of software functionality. The functional user requirements of the software are identified and each one is categorized into one of five types: outputs, inquiries, inputs, internal files, and external interfaces. There are a variety of ways to compute function points, depending on the context.

Summary

Many organizations are spread too thin to adequately do the job of testing. Other organizations do not have the testing skills and resources in-house to test critical upcoming projects. Getting full-time resources is often not possible due to budget constraints. Even when the funding is available, hiring and onboarding new testers is costly and time-consuming.

The problems seen in traditional outsourcing of testing are an inhibitor to sourcing testers outside of an organization. Test automation is frequently mentioned as a way to fill the resource gap. However, even with test automation, test teams are still stretched to the limit and test automation needs someone to create and maintain it.

Testing is not dead - it is an essential part of building and delivering software projects. There are tangible costs when projects are delayed, defective software is delivered, or when customers are lost. The real value of testing is not of saved cost, but of gained opportunity to gain customers and profits with software solutions that delight customers. This doesn't happen by accident, nor is there a magic formula to achieve it.

The co-sourcing model offers a new and compelling approach for meeting the human demands of testing while dealing with the challenges seen in other forms of sourcing.

Bio

Randall W. Rice

Randall (Randy) Rice is a leading author, speaker, consultant and practitioner in the field of software testing and software quality. He has over 40 years of experience in building and testing software projects in a variety of domains, including defense, medical, financial and insurance. He has authored over 70 training courses in software testing, including unit testing and software engineering. Randy holds many ISTQB certifications, including all three core Advanced Certifications, the Advanced Security Tester, Advanced Test Automation Engineer, Certified Mobile Tester, and Certified Agile Tester certifications.

Randy was the chair of the ISTQB Advanced Security Tester Working Party which created the 2016 Advanced Security Tester Syllabus.

Randy is co-author with William E. Perry of the books, *Surviving the Top Ten Challenges of Software Testing* and *Testing Dirty Systems*. He is on the board of directors of the American Software Testing Qualifications Board (ASTQB).

Randy founded Rice Consulting Services in 1990 and continues to train, mentor and consult with testers and test managers worldwide. Many of his clients deal with complex testing problems in critical applications. His clients often comment that his practitioner experience in the trenches adds great value to the concepts he teaches and the consulting he performs.

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