



INDEX

MESSAGE FROM THE PRESIDENT > 2

WSTPS MAIN FINDINGS

**\ \ \ **

EXECUTIVE SUMMARY

REPORT QUESTIONS & ANALYSIS > 8-39

8-10 > BACKGROUNDS OF RESPONDENTS

11-14 > ORGANIZATIONAL & ECONOMIC ASPECTS OF TESTING

15-23 > PROCESSES

24-31 > SKILLS & CAREER PATHS

32-33 > TOOLS & AUTOMATION

34-35 > TESTING TECHNIQUES & LEVELS

36-39 FUTURE OF TESTING

CREDITS

> 40

MESSAGE

FROM THE PRESIDENT



GUALTIERO BAZZANA ISTOB® PRESIDENT

ISTQB® (International Software Testing Qualifications Board - www.istqb.org) has created the world's most successful scheme for certifying software testers. As of December 2017, ISTQB® has administered well over 785,000 exams and issued more than 570,000 certifications in over 120 countries world-wide, with a growth rate of about 65,000 certifications per year.

As a nonprofit-organization with its mission of "advancing the software testing profession", ISTQB® regularly conducts survey to assess the trends in testing industry world-wide. Such report are publicly available on the ISTQB® Web Site. In 2015 we conducted the first survey looking at the "Worldwide Software Testing Practices", that is now followed by the second edition, that is published in this report.

The report covers several topics, ranging from organizational and budgetary aspects, to techniques/ processes/ tools, through skills and competencies; we think it provides useful information for all the professionals involved in the testing market, as well as direction for the further evolution of the ISTQB® scheme. This is an exciting time in the testing industry and the report data will significantly help the evolutions that ISTQB® is currently undertaking to ensure we develop and maintain syllabi that continue to reflect changing testing practices and that meet market demands.

The report was designed by the ISTQB® Marketing Working Group and endorsed by ISTQB® Member Boards, accredited training providers and exam providers, collecting more than 2000 responses from 92 countries.

I would like to thank all of you who responded to the survey; your valuable feedback will contribute to the improvement of the ISTQB® scheme.

WSTPS

MAIN FINDINGS

More than 2.000 people from 92 countries contributed to the ISTQB® Worldwide Software Testing Practices Report 2017-2018. In this year's report, respondents' geographic distribution is quite well balanced.

The outcome of the 2017 - 18 report is mostly in parallel with the results of the one done in 2015 - 16. L

Top five test design techniques utilized by software testing teams are use case testing, exploratory testing, boundary value analysis, checklist based, and error guessing.

New technologies or subjects that are expected to affect software testing in near future are security, artificial intelligence, and big data.

3

Test analyst, test manager and technical test analyst titles are the top three titles used in a typical tester's career path.

4

Main improvement areas in software testing are test automation, knowledge about test processes, and communication between development and testing.

1

Trending topics for software testing profession in near future will be test automation, agile testing, and security testing.

Non-testing skills expected from a typical tester are soft skills, business/domain knowledge, and business analysis skills.

EXECUTIVESUMMARY

Since the first release of ISTQB® World Software Testing Practices Report in 2015, many software development and technology trends have emerged or increased their prevalence. Agile frameworks, DevOps, continuous integration, continuous delivery, continuous testing, artificial intelligence, big data etc., continue to have an impact on how organizations develop software. Our latest report suggests that the challenges associated with these "hot topics" are recognized and driving developments in testing approaches and skills needs.

In the latest report, respondents indicate that:

- Testing responsibility: In-house test team, developers, end-users
- Improving the competency level of testers: Training on the job, certification of competencies, formal training
- SDLC model used: Agile, sequential, iterative
- Defect finding before test execution: review of requirements, review of designs, source code inspection
- Career path for a tester: Test analyst, test manager, technical test analyst
- Career path for a test manager: Test department director, project manager er, development manager
- Tools used: Defect tracking, test automation, test execution
- Main objectives of testing activities:
 To detect bugs, to show the system is working properly, to gain confidence
- Main improvement areas in software testing: Test automation, knowledge about test processes, communication between development and testing
- Test techniques utilized (top five):
 Use case testing, exploratory testing,
 boundary value analysis, checklist
 based, error guessing
- Test levels most budget allocated: System, integration, user acceptance, unit/component

The results above are similar to those in the 2015-2016 report; differences highlighted in the latest report include:

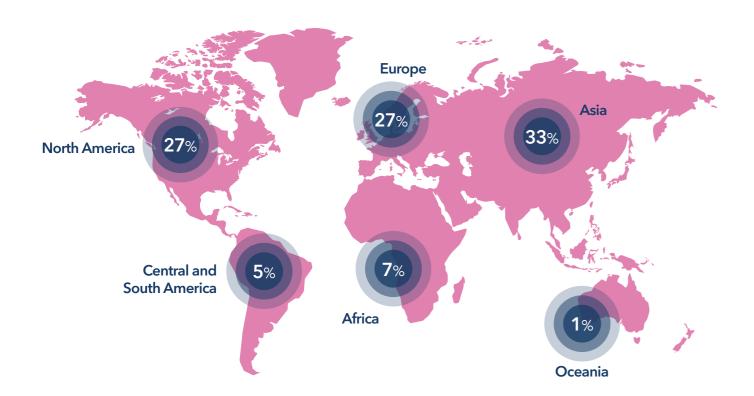
- Slight decrease in percentage of budget allocated to software testing in IT/R&D projects
- Increase in software testing budget expectations for the next 12 months
- · Increase in test automation

Respondents confirmed the following trends/technologies and challenges:

- Agile projects' testing challenges: Test automation, documentation, collaboration
- New technologies or subjects: Security, artificial intelligence, big data
- Trending topics for software testing: Test automation, agile testing, security testing
- Non-testing skills expected from testers: Soft skills, business/domain knowledge, business analysis

The comparisons and analysis indicate that traditional testing practices and techniques continue to be relevant; however, what were the challenges of tomorrow are now realities as reflected in the main areas for improvements and skills requirements for test professionals. Thank you to all respondents for supporting us in this report.

GEO DISTRIBUTION



TO WHICH INDUSTRY

DOES YOUR ORGANIZATION BELONG?



Information **Technologies**



Financial Services



Healthcare and Medical



Telecom, Media and Entertainment



Automotive



Public Sector



Consumer Products, Retail and Distribution



Education



Manufacturing



Energy and Utilities



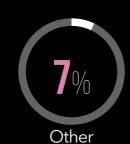
Transportation



Not currently employed



(Hotels, Lodging Places)



WHAT IS YOUR

CURRENT JOB TITLE?

Tester	43.7%
Test Leader	19.6%
Test Manager	12.6%
Manager	2.8%
Project Manager	2.4%
Business Analyst	2.4%
Developer	2 %
Other	14.4%



Almost half of all respondents are testers. 77% of responders are working in technical positions and 23% in managerial positions

WHO IS RESPONSIBLE

FOR SOFTWARE TESTING IN YOUR COMPANY?

* Selecting multiple choices were available



In-house test team



Developers



Only in-house test team



End Users



Distributed test team



Off-shore test team



In-sourced test team



Near-shore test team

Respondents indicated that amongst their orgnizations a majority are assigning their testing to an in-house test team (79.7%) and 30% of all respondents are using in-house test teams only.

HOW DOES YOUR ORGANIZATION

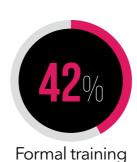
IMPROVE THE COMPETENCY LEVEL OF YOUR TESTERS?

* Selecting multiple choices were available

WHAT PERCENT OF A TYPICAL IT/ R&D PROJECT BUDGET IS ALLOCATED TO SOFTWARE TESTING?







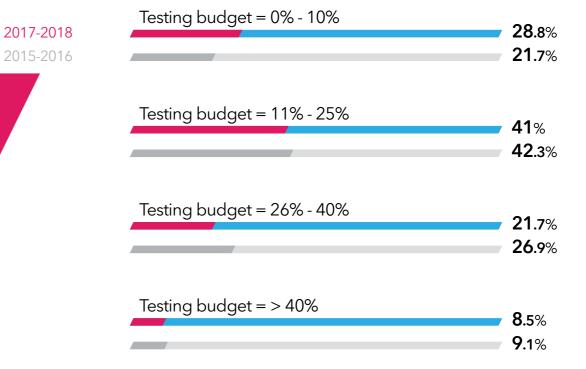






Formal training (42%) and certification (50.2%) rated highly as approaches to improving the competency of testers after on the job training (69.9%).

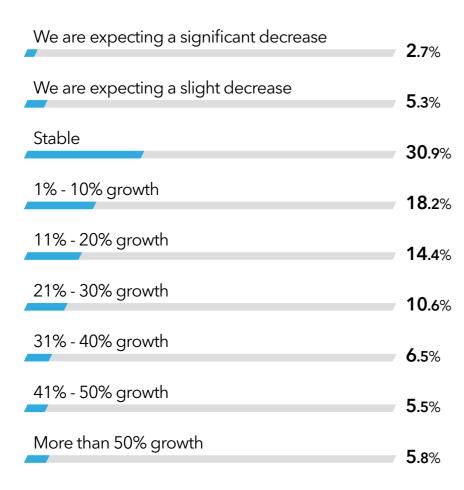




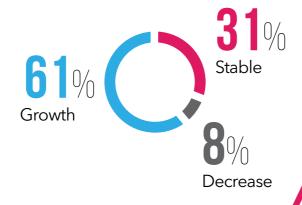
Main testing budget allocation is 11-25% from a typical IT/ R&D project. There is a a slight trend to reduce the budget allocated to software testing in comparison to 2015-2016 results.

WHAT IS YOUR EXPECTATION

FOR YOUR ORGANIZATION'S SOFTWARE TESTING BUDGET IN THE NEXT 12 MONTHS?



This year respondents are slightly more optimistic in comparison with the previous report, regarding expectations of growth in the budget allocated to testing for the next 12 months (61.1% vs 59.2%)



WHICH SOFTWARE DEVELOPMENT LIFECYCLE (SDLC) MODEL

ARE YOU USING?

* Selecting multiple choices were available



Agile (Scrum, Kanban, Extreme Programming)



Both sequential and Agile



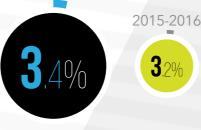
2015-2016

Sequential (Waterfall, Vmodel)



2015-2016

Iterative (RUP, Spiral)



Other

In 2018 we see a shift to more use of Agile models (~10% growth). 26.5% of respondents' organizations are implementing in parallel Agile and Sequential methods.

WHICH ACTIVITIES DO YOU USE

TO FIND DEFECTS BEFORE TEST EXECUTION?

* Selecting multiple choices were available

Formal review of the analysis documents/requirements

Formal review of the design documents

45.1%

Source code inspection

28.2%

Static analysis tools

77.2%

None

13.9%

Other

Review of the analysis documents/requirements remains the most widespread activity for early detection of defects.

WHAT ARE THE MAIN OBJECTIVES OF YOUR TESTING ACTIVITIES?

* Selecting multiple choices were available

As in the previous report, the main objective of respondents testing activities is "To detect bugs (88.1%). Next top three most popular answers are "To show the system is working properly" (68.6%), "To gain confidence" (55%) and "To evaluate requirements" (51.2%).

To detect bugs	88 .1%
To show the system is working properly	68.6%
To gain confidence	55 %
To evaluate requirements	51 .2%
To evaluate the user experience	45%
To comply with regulations	34 .6%
To be a customer advocate	27 .4%
To have zero defects	15 .8%
Other	1.8%

WHICH OF THE BELOW TESTING TYPES AND/OR TOPICS ARE IMPORTANT FOR YOUR ORGANIZATION?

* Selecting multiple choices were available

TESTING TYPES

Functional Testing	83%
Performance Testing	60.7%
Security Testing	44.6%
Usability Testing	44.1%
Accessibility Testing	28.2%
Reliability Testing	22.4%
Testability	20.5%
Availability Testing	19.8%
Maintainability Testing	19.3%
Efficiency Testing	18.8%
Scalability Testing	15.5%
Interoperability Testing	15.4%
Operability Testing	12.8%
Portability Testing	11.1%
Recoverability Testing	
Supportability Testing	10.4%
Extensibility Testing	6.7% 4.2%

TESTING TOPICS

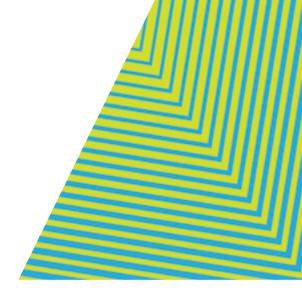
User Acceptance Testing	66%
Exploratory Testing	53.3%
Systems Integration Testing	46. 1%
Web Based Aplication Testing	44.3%
Mobile Testing	43%
Release Management	33.8%
Test Data Management	28.7%
Test Environments Management	26.9 %
Configuration Management	24%
Test Metrics and Test Effort Estimation	23.5 %
Non-regression Testing	23.5 %
Static Testing Static Testing	22 %
Testing Systems of Systems	16. 1%
Cloud Testing	15.3 %
Business Intelligence / Big Data Testing	13.6%
Embedded Systems Testing	10.2%
Internet of Things Testing	7.2 %
Other	3. 1%

Functional testing (83%) is the most important type of testing in respondent's organizations. This might be expected as without functionality all other non-functional aspects of a system become irrelevant.

With the increasing importance of users, functional testing is followed by user acceptance testing (66.0%). Performance testing (60.7%) is selected as the most important nonfunctional testing type among all other non-functional test types.

WHAT ARE THE MAIN IMPROVEMENT AREAS IN YOUR TESTING ACTIVITIES?

* Selecting multiple choices were available





Test automation



Maintaining Test Cases



Maintaining Test Scripts



Knowledge About Test Processes



Communication Between Business Analysis and Testing



Time



Communication Between Development and Testing



Knowledge About Test Design Techniques



Prioritization



Communication Between Project
Management and Testing



Test Data Preparation



Having Well Trained Personnel



Budget



Unrealistic Expectations of Other Stakeholders from Test Team



Other

Similar to the previous ISTQB® Worldwide Software Testing Practices Report conducted in 2015-2016, top three improvement areas in testing activities in this year's report are test automation (64.4%), knowledge about test processes (46.5%), and communication between development and testing (44.9%).

The forth ranked item in 2015-2016's report, knowledge about test design, is replaced by maintaining test cases (41.7%) in this year's report.

WHAT ARE YOUR TOP TESTING CHALLENGES

IN YOUR AGILE PROJECTS?

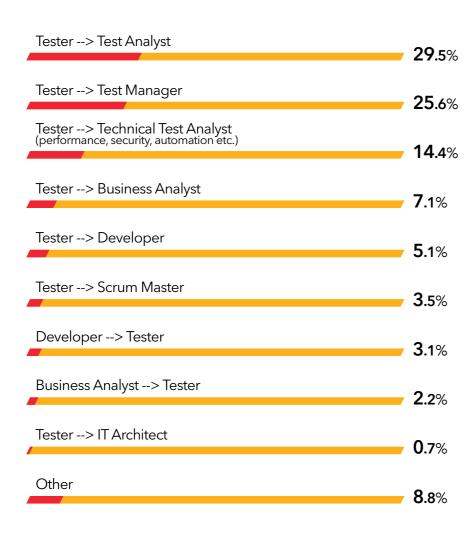
* Selecting multiple choices were available

Test Automation 43,4% Documentation 34,7% Collaboration 28,9% **Test Effort Estimation 28**,7% Exit / Entry Test Criteria 26,9% Risk Awereness **25**,2% Cross Functional Needs 24,6% **Quality Ownership** 23,8% **Decision Making** 20,4% Traceability **19**,5% Test Reporting **18**,7% Legacy Defects **15**,5% Not Applicable 13,7% Regulatory / Compliance Issues **9**,2% Other **3**,6%

The top three testing challenges in Agile projects are test automation (43.4%), documentation (34.7%), and collaboration (28.9%). The root cause behind these challenges may be continuously evolving nature of software in Agile projects, cultural challenges/ resistance to Agile ways of working. All of these challenges make test effort estimation hard to predict which is the forth ranked challenge in the question (28.7%).

WHICH CAREER PATH

IS MORE COMMON FOR A TESTER IN YOUR ORGANIZATION?



Test Analyst (29.5%) and Test Manager (25.6%) are the most typical career paths for testers within respondent's organizations. No change from the previous report.

WHAT COULD BE THE NEXT LEVEL

IN THE CAREER PATH FOR A TEST MANAGER?



Test Department Director



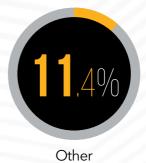
Project Manager



Development Manager



Chief Technology/Information
Officer



Test Department Director (40.7%) and Project Manager (40.1%) are the most typical career paths for Test Managers within respondent's organizations. In the last report 44% and 37% respectively for these careers.

WHICH TESTING SKILLS

DO YOU EXPECT FROM TESTERS?

* Selecting multiple choices were available



Test Execution



Bug Reporting



Test Design



Test Analysis



Test Automation



Test Planning



Test Strategy



Test Implementation



Test Monitoring



Bug Advocacy



Other

Report results indicate that there are at least eight skills which are rated 50% or above by the respondents. This result shows that a good tester should have a holistic understanding of the testing process which is not only limited to test execution (70.1%) and bug reporting (68.1%). Test design (67.8%), test analysis (67.7%), test automation (62.3%), test planning (60.6%), test strategy (52.9%), and test implementation (50.4%) are as important as or even more important than just running tests and reporting bugs.



WHICH OF THE FOLLOWING NON-TESTING SKILLS ARE MOST EXPECTED FROM AN AGILE TESTER IN YOUR ORGANIZATION?

* Selecting multiple choices were available



JOIL JKIIIS	54.8 %
Business / Domain Knowledge	41.9 %
Business Analysis	40.9%
Tool Knowledge	40.1%
Risk Estimation	38.9%
SDLC Knowledge	33.5%
Continuous Integration	32.7%
Workload Estimation	28.8%
Database	28.2%
Coding	26.1%
System Analysis	25.9%
Project Management	18.3%
UX/CX	13.5%
Network	
Enterprise Analysis	9.8%
Other	6.9%
	2 %

Soft skills (54.8%) and business centric skills such as business/domain knowledge (%41.9), and business analysis (%40.9) skills are more expected than other non-testing skills from an Agile tester according to the survey respondents.

WHICH OF THE FOLLOWING NON-TESTING SKILLS ARE MOST EXPECTED FROM NON-AGILE TESTERS IN YOUR ORGANIZATION?

* Selecting multiple choices were available



37.7% Business Analysis

34.1% Tool Knowledge

30.2% System Analysis



34.8% SDLC Knowledge

33.3% Risk Estimation

26% Database

















Similar to Agile Testers, Non-Agile Testers are also expected to have soft skills (45.2%), business/domain knowledge (38.9%), and business analysis (37.7%) skills. According to the report, forth ranked nontesting skill expected from non-Agile tester is SDLC knowledge (34.8%) and fifth is tool knowledge (34.1%).

WHICH TOOLS

DO YOU USE IN YOUR ORGANIZATION?

* Selecting multiple choices were available

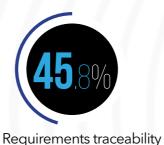




















Test design

Unit testing

Static analysis





Other

There is no signicant change in the types of tools used since the last report. The most commonly used tools among test teams are defect tracking, test automation, test execution and test management.

TOOLS & AUTOMATION

WHAT IS THE PERCENTAGE OF AUTOMATED TEST CASES YOU USE WITH RESPECT TO YOUR OVERALL TEST CASES?







11% - 20%

21% - 30%



41% - 50%

31% - 40%

More than 50%

The percentage of companies that do not use automated tests is still high (21.2%). Almost half of respondents that implemented automated tests reported that their coverage is up 20%. Leading industries with coverage of more than 40% are automotive (59.2%) and telecom, media and

entertainment (27.1%)

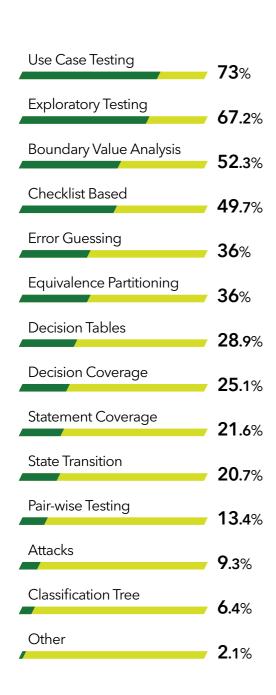


automated tests

WHICH TEST TECHNIQUES

ARE UTILIZED BY YOUR TESTING TEAM?

* Selecting multiple choices were available



The top five test techniques selected by survey respondents are the same as those selected by the survey respondents for the report conducted in 2015-2016. Beginning from the highest ranking technique, top five techniques are use case testing (73.0%), exploratory testing (67.2%), boundary value analysis (52.3%), checklist based (49.7%), and error guessing (36.0%). Compared to the previous report, only boundary value analysis and checklist based techniques switched their rankings. While the boundary value analysis technique moves up in the ranks and becomes the third ranked item, checklist based technique moves down in the ranks and becomes the fourth ranked item.

TO WHICH TEST LEVEL (S) IS MOST OF YOUR BUDGET ALLOCATED?

* Selecting multiple choices were available



System



Integration



User Acceptance



Unit / Component



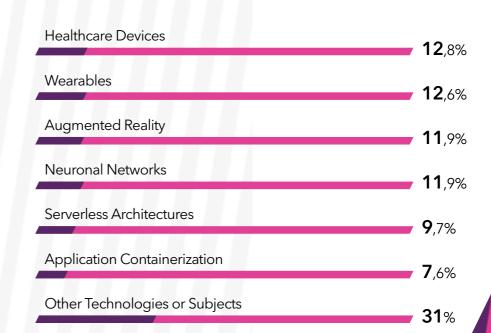
I don't know

There has been no change in ranking since the last report in 2015-2016. Again, system testing (52.1%) is absorbing most of the testing budget; followed by integration testing (39.2%), user acceptance testing (38.1%), and unit/component testing (21.5%).

WHICH NEW TECHNOLOGIES OR SUBJECTS WILL BE IMPORTANT TO THE SOFTWARE TESTING INDUSTRY IN THE FOLLOWING 5 YEARS?

* Selecting multiple choices were available

Security	52 ,2%
Artificial Intelligence	
	49 ,9%
Big Data	49%
Cloud	48,8%
Continuous Integration	39 ,9%
Continuous Testing	
	38,7%
DevOps	37 ,7%
Performance	37%
Machine Learning	
	36 ,5%
IoT - Internet of Things	34,9%
Usability	25 ,5%
Cognitive Test Automation	
C. I.I. iii.	23 ,2%
Scalability	17 ,7%
Microservices	15 ,6%



Security testing (52.2%) is considered as the most important subject to the software testing industry in the next 5 years. Exponential growth in computational power and available data make artificial intelligence (49.9%) and big data (49.0%) as the second and third most important subject to software testing industry respectively.

WHAT WILL BE THE MOST TRENDING **TOPIC** FOR SOFTWARE TESTING PROFESSION IN NEAR FUTURE?

* Selecting multiple choices were available









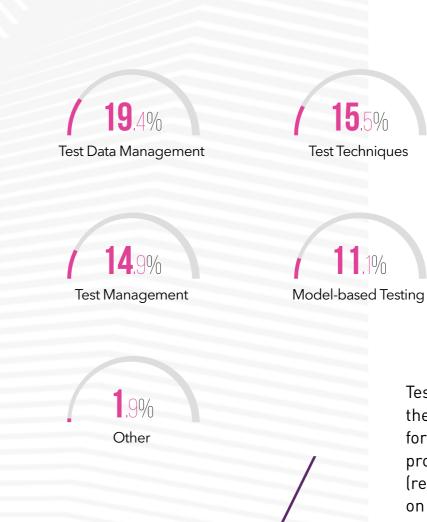












15.4%

UsabilityTesting

3.7%

Static Testing

Test automation is ranked as the highest trending topic for the software testing profession in the near future (refer also to Question on page 20 where test automation is also higlighted as the main improvement area in software testing). Increasing adoption of Agile frameworks and growing security issues in IT industry make agile testing (57.5%) and security testing (49.0%) as the second and third most important trending topic respectively.

CREDITS

COORDINATORS OF THE REPORT



Yan Baron ISTQB® Marketing WG iDMsoft, Test Manager



Koray Yitmen ISTQB® Marketing WG Turkish Testing Board, President Keytorc Software Testing Services, Partner

GRAPHICAL EDITING



Gizem Taşçı **Graphical Editing**



Okan Coşkun Graphic Design

MAIN CONTRIBUTORS



Alon Linetzki ISTQB® Marketing WG Chair, ITCB® Vice President & Marketing Lead QualityWize™ Founder

and CEO

www.quality-wize.com



ISTQB® Marketing WG, Strategy Stream Leader Co founder and CEO www.saltuniv.com

Ritendra Banerjee

Entrepreneur, $Author\ and Mentor$ www.ritendrabanerjee.com



Debbie Archer Managing Director iSQI UK



