

Achieving Olympic Success on Software Projects with Scope Management

by Carol Dekkers, PMP, President, Quality Plus Technologies, Inc.

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Analogous approaches from other industries often provide illumination of key concepts to benefit software intensive systems projects. The latter are some of the most complex, monolithic, and costly of all project management challenges today, not only because of technology novelty but because of the sheer amount of focused customer and developer communication that must occur.

While project management has provided rigor and structure to such software intensive systems projects, project management alone is often not sufficient to bridge the gap. Customers (who can find it difficult to articulate their requirements to get the results that they need) and suppliers (who are the technical brains behind the project solution delivery) have few problems communicating internally amongst themselves, yet communication across the groups can range from a minor gap to a deep crevasse. In both Australia and Finland, researchers explored this issue and came up with remarkably similar results in approaches called southernSCOPE and northernSCOPE.

Both approaches provide relief in their jurisdictions that tackle head-on the top root causes for software intensive systems project failures. An interesting point is that while geographically diverse, Australia and Finland arrived at remarkably similar approaches, both building on known best-practices available to the software industry. These multidisciplinary approaches can be compared to how triathlon athletes train for the big event - and this is the topic of this paper. Both northernSCOPE and southernSCOPE emphasize solid training and planning to solve more than six out of the ten top reasons for project failure. This paper presents an analogous look at how the formal scope management concepts mirror triathlon athlete performance in training and racing – and how they can bring success to your next software project.

1. Why does one need training to compete in the Olympics?

Any athlete who wants to achieve success in a multidisciplinary sport such as the Triathlon, knows that a good deal of preparation goes into all three events and, additionally, the transition phase between each event. To achieve Olympic level success requires dedication, discipline, practice, and attention to minute detail. Triathlon is one of the newest and most difficult of all Olympic sports, and the state of one's mental condition is as important as the physical conditioning required to become a serious competitor. Training for it presents a series of inter-disciplinary challenges because of the diversity of the three different stages (swimming, biking, and running), each of which entails different but rigorous preparation and mental stamina. Each component is as important as the next, and a serious athlete knows that mastery of all skills and the transitions between each component are critical to overall success.

2. Formalized Scope Management: Triathlon Style Coaching

At first glance it may seem that there is no comparison between the typical customer's experience with software intensive systems and preparing to compete in a triathlon. The

comparison is that, just as in a triathlon, software intensive systems development consists of three major events - preliminary requirements/RFP (request for proposal), developing the software system, and managing change. In between each is a transition: 1. Awarding the contract to a supplier, and 2. Identifying change. Additionally, at the end of the project or finish line, it is important to document lessons learned. Noting that the Standish Group's CHAOS reports continually cite that over 1/2 of software projects fail, it is clear that customers needing to complete a successful project need a coach to train them through the events and transitions. Just as an athlete wants to accomplish a triathlon, most customers want to score a positive outcome with software intensive projects. A certified scope manager (CSM) is an ideal coach for customers with software intensive systems projects! Software intensive programs are customer driven initiatives designed to meet a business objective. Suppliers of such systems are typically well-versed and skilled to deliver technology based solutions; but not so are the customers who must specify early requirements and engage such solution providers. At the earliest stages of a project (before requirements are complete and before a contract is awarded), customers often demand fixed price contracts thinking that such action will guarantee adherence to budget. The only problem is that it is impossible to determine a budget before it is known what will be built. Wary customer groups want to curtail costs of their investment by demanding an upper fixed price estimate; while at the same time suppliers want to be paid for the work they perform on behalf of developing the customer driven solution to requirements yet to be defined. This situation poses a multi-disciplinary challenge to the success of technology projects. What we need is a coach to properly position the customer organization for productive participation and trust? Most mid- to large-scale systems that encompass the delivery of software are candidates for scope management "coaching". In fact, any software project, where the customer needs to ensure that they receive the software they need, is well suited for formalized scope management. The "coach" is called a scope manager and he/she acts as a supportive, knowledgeable coach for customer team members.

2.1 Approaches to Scope Management

Two formal scope management approaches exist today: SouthernSCOPE from the Victorian

1. State Government in Australia, and
2. NorthernSCOPE™ established by the Finnish Software Measurement Association (FiSMA).

< Both approaches focus on scope management as the core principle, and use best-practice approaches throughout. Such concepts include early program and project estimating; unit pricing; baselining the software size; formal change management; objective measurement; project management; communication; and the use of an experience repository for collecting lessons learned.

2.2 Definition of Success

Just as a successful triathlon is a function of rigorous training, coaching, and well planned competition support, similarly, professional and systematic scope management support throughout an initiative is necessary for successful software development programs.

Systems customers (acquirers) need a support team to deliver targeted coaching and skills training during the development, and at its heart should be an enthusiastic, and experienced “scope manager”. In addition, to be successful customers must be receptive to that training and coaching. Success means that all of the component projects are finished to the satisfaction of the customer organization, thereby meeting or exceeding their specified requirements, incorporating mutually agreed upon scope changes, and finishing within the agreed upon schedule and budget.

2.3 Concepts of Scope Management

The 2003 CHAOS report by the Standish Group attributes four major factors to software project success including: Senior Management Support; Scope Management; User Involvement; and Formal Basic Requirements. Other studies support similar factors, and failed projects (67%) can become successful by focusing on these traits. Einstein says that insanity is doing the same thing over and over and expecting different results - and it follows then that repeating successful practices should result in continued success.

Both Southern and northernSCOPE™ approaches divide software intensive systems projects into phases (in triathlon terms: “Events”) as outlined in Table 1 shown on the following page.

2.4 The Scope Manager Role

An experienced and knowledgeable scope manager can be as critical to software intensive systems customers as an olympic coach is to new triathletes. Scope managers ideally possess skills including:

- Business analysis
- Formal project management
- Knowledge of measurement industry productivity databases
- Software measurement (including functional size measurement; and assessment of non-functional quality requirements)
- Understanding of northernSCOPE™ processes
- Senior advisory skills (negotiation, communication, progress reporting)

The scope manager acts as a customer advocate and is typically retained by (and paid by) the customer. The corporate pain, expense and overall frustration with prior program failure often provide solidarity. In Finland, (as throughout the world), at least five major national government departments have retained the skills of a certified scope manager since 2004. As additional organizations discover the value to cost ratio that is provided by a qualified scope manager, the demand for Certified Scope Managers will increase. Currently all proof of concept data is anecdotal, however, several research studies are proposed to unequivocally prove the value of the concept.

Phase	Characteristics	Skills Needed	Hazards	Keys to success in Phase
Pre-contract award (several weeks to several years)	Feasibility study; preliminary requirements; Request for Proposal (RFP) preparation	Understanding the different types of development work; knowledge of best practices of requirements specification (functional and non-functional) and software sizing (functional size measurement) skills	Monolithic development programs with hybrid mixtures of unknown requirements; incomplete RFPs with ambiguous or missing requirements; overzealous suppliers; demand for fixed price based on imperfect and incomplete requirements	Early identification of need for and engagement of skilled scope manager; division of acquisition program into discrete projects; identification and early analysis of functional and non-functional requirements; early software size estimates; solid RFP preparation by project
Transition: Engage supplier (1-6 months)	Receive, open, evaluate and compare RFP responses; supplier interview, negotiation and selection	Analysis, and negotiating skills; knowledge of contract and unit pricing models	Inconsistent proposals; selection of inappropriate pricing model; incomplete or unreasonable RFP responses	Trust and understanding established with chosen supplier(s)
Requirements specification (1-6 months)	Formalize and articulate complete set of functional and non-functional requirements for each project	Understanding requirements types and levels; excellent documentation, writing, and reviewing skills	Misunderstanding or impatience regarding the definition of requirements types and levels; scope creep and gold-plating based on supplier needs	Complete set of product requirements; Baseline size for functional user requirements of each subsystem and project
Transition: Sign contract(s) and formally baseline project plans (days to months)	Contract(s) with suppliers signed for construction	Contract and legal experience; risk management skills	Overly complex or obscure legal agreements; incorrect pricing models; lack of legal advice; emphasis on sanctions instead of scope	Reality check validation for tendered prices (based on industry S/Function Point(FP) whenever applicable)
Software intensive system construction (6 months to 3 years)	Systems and software design, construction, testing and pre-installation. Program closure occurs after delivery of all subsystems; Results are evaluated and experience data collected and recorded	Knowledge of customer business and objectives of program and subsystems; detailed eye to gauge progress and identify issues; project management skills; ability to formulate changes and identify errors; measurement skills.	Uncontrolled scope creep; lack of senior management commitment; adhoc or informal change management; lack of quality control; artificially imposed deadlines; risk ignorance	Measured and managed formal change control; earned value reporting and monitoring by subsystem (based on FP as applicable); progress monitoring; post-delivery payment based on delivered product size (unit pricing); data collection in an experience repository

Table 1: Scope Management Program Phases (and Pre-requisite Customer Skills)

3. Proven scope management “downunder”

In 1995, the Victorian State Government in Australia introduced southernSCOPE on its custom software development projects. According to the originator of the method, Mr Terry Wright (Australia), “In 2000 a study of the extent and impact of its use was undertaken and resulted in the release of a revised approach. Although the number of projects that had used the approach was small, their nature was diverse. The results were outstanding:

- All projects completed within 10% of the initial project budget
- They all had a high customer satisfaction in that the software met the intended business need

- Their cost per unit was in the lowest 25% of comparative industry benchmarks.” (Wright) Continuing in the same journal, why then is the southernSCOPE method so effective? The method successfully enabled the following problems inherent in the software engineering process to be addressed:
- Realistic cost estimates are provided at project inception
- The functional requirements developed and agreed to are sound and unambiguous
- The customer is able to make objective decisions in language he understands as to what functionality should be provided within the agreed budget

3.1 The Future of Scope Management

When we examine the similarities between a triathlon training program, the athletes involved, and the importance of a dedicated coaching staff, one can easily see how the formal scope management can provide preclusions to a successful finish for software intensive systems. For customers involved in software development programs, their success too depends on ultimate trust in the scope manager, and a focus on the following aspects of preparation: understanding of the core business and program objectives; subdivision of program components into discrete projects; ability to articulate and explore preliminary functional and non-functional requirements; clarity of purpose to prepare RFP's for supplier unit pricing responses; ability to objectively evaluate and select most suitable supplier(s); stamina to remain committed to the program despite false starts; devotion to participate and review aspects of the ongoing program development; commitment to scope management processes; functional size measurement; earned value / function point progress reporting; formal change management; program closure and lessons learned review and identification. The jury is in based on limited results already in Finland that reinforce the success of the northernSCOPE™ concepts: projects managed formally with northernSCOPE™ principles are remarkably on budget and on scope as attested to by the various national ministries employing a certified scope manager. Documented proof of such real-life cases are forthcoming as the projects complete in Finland in fall 2009.

In summary, a scope manager is similar to a triathlon coach in the following analogous ways:

- When requirements are vague or preliminary, this is similar to the difficulty triathlon swimmers experience in seeing the direction ahead. The scope manager provides guidance similar to a coach in a boat providing navigational advice about how to turn and whether to slow down and pace oneself in the event.
- When a supplier has been chosen based on unit pricing and the RFP response, the requirements phase goes fast but can be laden with incomplete or incorrect requirements. The scope manager in this case is like the coach driving in a vehicle alongside a group of bicycle riders with extra tires, and able to provide assistance should there be an accident during the event.

- During the main event (running for the triathlon, and the actual program development from design through to coding and final testing), the scope manager provides regular roadside reporting concerning potential hazards and challenges on the road ahead, and provides an upto- date report on expenditure of resources compared to the progress thus far (earned value management reporting), and any upcoming changes to the course.
- At the completion of the competition, the coach and the athlete review the race components and strategize on future training goals for continued success. At the completion of the software program, the scope manager collects data and reviews with the customer team the successful delivery plus what can be better done next time.

It took almost 30 years for the Triathlon competition to be become officially recognized as an Olympic Event. This author is confident that scope management concepts will soon become accepted principles in the mainstream of our industry - and that it will take less than an Olympian 30 years to do so!

About the Author

Carol Dekkers is an international technology expert and speaker who provides expertise and advice to global corporations in the areas of globalization, communication and culture, software and systems measurement, quality and process improvement. Her keynote addresses are renowned for being able to present technical information in a manner highly digestible and understandable by the non-technology masses and technology professionals alike. Ms. Dekkers is the founder and president of Quality Plus Technologies, Inc., and a partner in 4SUM Partners, both of which work with a) customer companies who want to improve their success in acquiring the software they need, and b) with supplier companies who want to improve their on-time and on-budget software delivery through professional SCOPE Management. Carol is a past president of the International Function Point Users Group (IFPUG), a technical advisor to the International Software Benchmarking Standards Group (ISBSG), and a delegate to ISO's SC7 (Software and Systems Engineering) committee. Carol's professional designations include Project Management Professional (PMP), Certified Management Consultant (CMC), Certified Function Point Specialist (CFPS), and Professional Engineer (P.Eng.-Canada). Carol's international speaking experience spans more than 25 countries, where she has spoken about software measurement, global software development issues, and more recently, the value of SCOPE Management. She is co-author of five books, two of which were released in 2008: *The IT Measurement Compendium: Benchmarking and Estimating Success with Functional Size Measurement*; and *Program Management TOOLKIT for Software and Systems Development*; and three others *Practical Software Measurement: Advice from the Experts*; *Practical Project Estimation, 2nd Edition*; and *Fundamental Concepts for the Software Quality Engineer, Volume 2*. She has presented in more than 25 countries and is part of the PMForum Ambassadors speakers bureau, a professional member of the National Speakers Association, and the International Federation For Professional Speakers (IFFPS).

For further information and to book Ms. Dekkers to present at your next conference or corporate event, please email her at Dekkers@qualityplustech.com or visit

www.caroldekkers.com or www.qualityplustech.com.

References

Dekkers, Carol and Pekka Forselius, presentation and proceedings of the International Project Management

Association global congress, September 2008, Rome Italy.

FiSMA, the Finnish Software Measurement Association, northernSCOPE™, 2007,

www.fisma.fi, Finland Standish Group, March 25, 2003 press release for the 2003

Chaos report (<http://www.standishgroup.com/press/article.php?id=2>) Wright, Terry, With or Without a Navigator? -- It's Your Call, Software Tech News, July 2006, Volume 9, Number

3, www.softwaretechnews.com, published by the U.S. Department of Defense