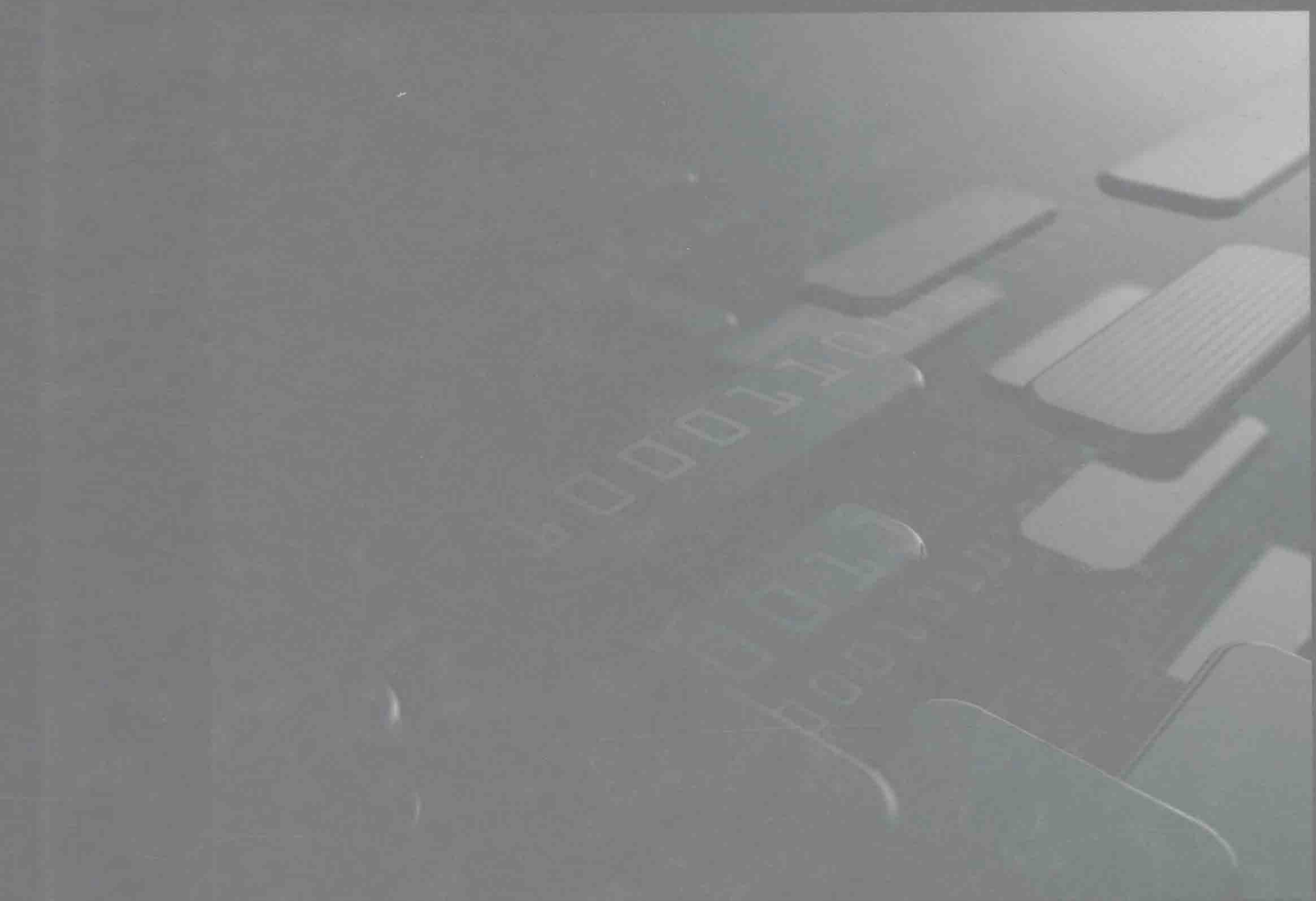
PREMIER REFERENCE SOURCE

Project Management Techniques and Innovations in Information Technology



John Wang

Project Management Techniques and Innovations in Information Technology

John Wang
Montclair State University, USA

Information Science
REFERENCE

Managing Director: Lindsay Johnston
Senior Editorial Director: Heather A. Probst
Book Production Manager: Sean Woznicki
Development Manager: Joel Gamon
Development Editor: Development Editor
Acquisitions Editor: Erika Gallagher
Typesetter: Jen McHugh
Cover Design: Nick Newcomer, Lisandro Gonzalez

Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com

Library of Congress Cataloging-in-Publication Data

Project management techniques and innovations in information technology / John Wang, editor.
p. cm.
Includes bibliographical references and index.
Summary: "This book presents the latest research, case studies, best practices, and methodologies within the field of IT project management,offering research from top experts around the world in a variety of IT project management applications and job sectors"--Provided by publisher.
ISBN 978-1-4666-0930-3 (hardcover) -- ISBN 978-1-4666-0931-0 (ebook) – ISBN 978-1-4666-0932-7 (print & perpetual access) 1. Information technology--Management. 2. Project management. 3. Management information systems. I. Wang, John, 1955-
HD30.2.P758 2012
658.4'038--dc23

2012000024

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

Preface

PROJECT MANAGEMENT TECHNIQUES AND INNOVATIONS IN INFORMATION TECHNOLOGY

"Project Management Techniques and Innovations in Information Technology" belongs to *Advances in Information Technology Project Management series* book project. There are six sections and 19 chapters in this book.

RESOURCE ALLOCATION AND SCHEDULING

Section one consists of three chapters. Mihalis M. Golias, Maria Boilé, Sotirios Theofan, and Heidi A. Taboada propose "A Multi-Objective Decision and Analysis Approach for the Berth Scheduling Problem" in chapter 1. The berth scheduling problem deals with the allocation of berth space and service time slots to vessels at marine container terminals. Ocean carriers compete over the available berths, and service time slots and several factors affect the decision of the terminal operator to assign the available quay side resources. As with most real-world scheduling problems, the berth scheduling problem is explicitly multi-objective as the terminal operator is faced with pressure by liner shipping operators for increased effectiveness and punctuality of services (berthing and vessel loading/unloading operations). These objectives include reduction of vessel turnaround time, increase in port throughput, keeping the customers' satisfaction at a desired level, and minimizing the emissions of the vessels on-route and at the port. Addressing these objectives simultaneously and selecting the *best* berth schedule can present a challenge to terminal operators. In this chapter, the multi-objective berth scheduling problem is studied, and a methodology for selecting a subset of schedules over the entire feasible space is proposed. The methodology allows the port operator to efficiently evaluate the majority of the feasible berth schedules, and select the ones with a dominant performance over a number of different objectives. The approach presented herein ranks the objectives non-numerically in order of relative importance, without having to specify weight values and allows for the selection of a small number of competing schedules to be selected even in the case where the relative importance of the different objectives cannot be determined. The proposed methodology is repeatable and reliable, and a significant decrease in the solution space can be obtained without any sacrifice in the objectives' performance. The proposed method can further be applied as is to other scheduling/assignment problems for which computing the competitiveness of a solution over a number of alternatives is not feasible.

In chapter 2, Dan Trietsch explores "Optimal Crashing and Buffering of Stochastic Serial Projects." His first paper on optimal safety time in a project context (with Boaz Ronen) was written in 1986. This chapter is on the problem of optimal crashing of stochastic activities. Whereas it is possible to solve the

problem by sample based optimization, the task is greatly facilitated if serial subprojects can be combined to single tasks. This chapter shows how to do that, and thus constitutes an important link in the development of a better comprehensive approach to project scheduling. The crucial point is that it is not correct to just focus on the mean, because crashing a stochastic activity also changes its variance. Often, as an activity is crashed, its variance is reduced too. As a result, crashing may be more beneficial than suggested by analyzing only the mean. Results are provided not only for independent activities but also for positively correlated ones. Since completing this chapter Dr. Trietsch has been involved in further research on project scheduling, published in *EJOR* (with Lilit Mazmanyan, Lilit Gevorgyan, and Ken Baker; doi:10.1016/j.ejor.2011.07.054). This research shows the particular relevance of the lognormal distribution both for single project activities and for serial subprojects. The lognormal distribution is shown to provide statistically valid fit for project activities. It also provides an excellent approximation for sums of lognormal distributions even if they are positively correlated. Finally, chapter 2 shows how to account for the Parkinson effect (hidden earliness). Nonetheless, the results of this chapter can be easily applied in combination with the new insights. Thus, this chapter remains an important building block in the new project scheduling framework Trietsch is working on, designed to replace both traditional PERT and Critical Chain. For more on the new framework, see his forthcoming *IJPM* paper (with Ken Baker), "PERT 21: Fitting PERT/CPM for Use in the 21st Century" (doi:10.1016/j.ijproman.2011.08.001).

In Chapter 3, Yuval Cohen and Ofer Zwikael provide "A New Technique for Estimating the Distribution of a Stochastic Project Makespan." Timely completion of large and mega projects remains a challenge and a critical stumbling block despite the introduction of various project scheduling techniques. While the gap between PERT and reality, and even between PERT and simulations, has been addressed by many papers, only general explanations were given to this gap, and only scant insight was offered for better estimation of project's duration. This chapter suggests an approach that will help mitigate/eliminate the shortcomings of the aforementioned approaches; its complexity is low, it gives an accurate estimate of the project's makespan probability in chosen points, and its precision could be adjusted as desired by adding or subtracting estimation points (complexity is linearly proportional to the number of points). In addition, the chapter gives an important insight based on an analytical approach connecting the network structure to this estimation gap, and suggests a technique for better estimating a project's duration. The chapter analyzes the behavior of time duration distributions of projects in stochastic activity networks and proposes a simple computation scheme for approximating their distribution. The effect of parallelism is illustrated and gives a strong support for conservative estimations of project duration. A simple algorithm for estimating the makespan cumulative distribution is presented. The algorithm is based on forward recursive computational approximations and was validated by comparison to simulation results. The technique calculates for each AOA node a piecewise linear approximation of its distribution function. Thus, the accuracy of the proposed technique depends on the number of linear segments in the approximation. While this may be a limitation, the computational complexity of adding a new linear segment to the project distribution function is proportional to the number of nodes. The findings offer understanding of the large gap between PERT and simulation results, and the deviation of projects from their intended schedules. In addition to providing theoretical framework, the proposed approach also proposes a simple practical pragmatic technique that computes the time distribution of project duration. This is a simple and handy tool for the project manager that may replace simulation. As a byproduct, the earliest start time distribution for each activity is also estimated. This chapter gives project scheduling practitioners a practical tool for estimating the project duration distribution in the

presence of task time variability. The proposed technique may be applied in many organizations, and assist in estimating realistic project durations.

REQUIREMENTS UNCERTAINTY AND TECHNOLOGICAL RISKS

Section two involves two chapters. In Chapter 4, Huub J.M. Ruël, Tanya Bondarouk, and Stefan Smink present "The Waterfall Approach and Requirement Uncertainty: An In-Depth Case Study of an Enterprise Systems Implementation at a Major Airline Company." The authors address the issue of the high failure rates of Enterprise Systems (ES) implementation projects. Many project management methodologies and tools have been developed throughout the years that claim to contribute to ES project success, and the importance of project management is fully acknowledged in the literature. In software project development studies, the Waterfall approach is the one referred to predominantly. However, in response to growing environmental uncertainty and flexibility, the Waterfall approach is being criticized for its rigid character. The authors of this chapter contribute to this debate by starting from the assumption that the Waterfall approach in practice is not as ill-suited to the dynamics of ES projects as its critics claim, since it is still the most widely used approach for ES implementation projects. The leading research question therefore is: How does a Waterfall approach-based ES project cope with requirements uncertainty?

As an alternative to the Waterfall approach, a new form of ES project management has emerged since the late 1990s, called the Agile approach. It took until 2001 before the concept of the Agile approach was formally born. In that year a group of prominent practitioners agreed upon the basic values of the Agile approach as laid down in the Manifesto for Agile Software Development. The Agile approach accommodates the volatility of requirements and focuses on collaboration between developer and end-users.

By means of an in-depth case study, the authors collected data about an ES project at a major airline company during eight months of full-time access to project meetings, project documentation, and direct observations and by conducting semi-structured interviews with project managers and team members. Through data triangulation and interviewing different stakeholders, the authors were able to reconstruct the 'story' of the ES project. The in-depth case study makes clear that a Waterfall approach-based ES project deviates in practice to certain, but crucial extent from its features as presented in the literature. In practice a Waterfall approach-based ES project includes a joint (developers plus end-users) design and coding stage, and involves a number of iterations. In this way, adjustments to the requirements can be made and changes included before a final design is approved.

Furthermore, the case study shows that requirements are subject to change in an ES project. However, a Waterfall approach-based ES project does not turn out in practice to be as simplistic and inflexible as opponents of the approach claim. It does include features typical of an Agile approach, such as iterations, early releases, and frequent end-user feedback, though in a more moderate way. By doing so, a Waterfall approach-based ES project keeps its original focus on planning, but is more flexible in responding to requirements uncertainty and changes. In the in-depth case study at the major airline, this turned out to be sufficient and resulted in successful user acceptance of a new ES. Interestingly, the impact of requirements uncertainty and changes in practice was less than the literature suggests. The authors' main conclusion is that the demise of the Waterfall approach for ES implementation projects is not imminent. In practice, this approach seemed to be an appropriate one to successfully implement an ES.

In Chapter 5, Constanta-Nicoleta Bodea and Maria-Iuliana Dascalu demonstrate "IT Risk Evaluation Model Using Risk Maps and Fuzzy Inference." The chapter presents an interesting risk evaluation

model, based on fuzzy reasoning. The core part of the proposed model is a causal cognitive map of the project risks, which is defined starting from the Software Engineering Institute risk taxonomy. The fuzzy model considers risks according to their source (management, cost, technology, production, environment, and schedule) and the project lifecycle (initiation, planning and resource procurement, design and implementation, bug fixing and installation, and maintenance). The model quantifies the risks based on the crisp values of the risk sources, but due to the fuzzy logic mechanisms, the results are more than single-point estimates. The following two phases are defined by the authors in order to work with the model: the risk identification, using a database designed by experts and the development of the risk map and fuzzy inference components. The causal cognitive map is used to describe the propagation of risk throughout the project, according to the transitivity principle of the risk propagation chains.

The fuzzy rules applied by the fuzzy inference components are built on two parameters: the probability of risk occurence, and the impact on project development. Each phase of the model is thoroughly documented using numerical values. In order to validate the model, the authors have developed a software tool implementing the basic fuzzy sets operators, the main defuzzification methods, and the required inference rules. The chapter presents a case study for computing the technological risks of an e-testing project. The input values, the classification of the input values into suitable fuzzy sets, the calculation of the membership level of each input value, and finally, the fuzzy reasoning steps, are all provided. Two defuzzification methods were applied: the Centre of Gravity (COG) and the Middle of Maximum (MOM). These two defuzzification methods reveal similar results, meaning that the model is valid. The conclusion is that the technological risk has a low probability of occurence, because the technological maturity is somewhere between high and very high and the number of applied technologies are medium-high. The authors conclude that the risks for this particularly IT project type are strongly related to the number of applied technologies and the market maturity.

KNOWLEDGE MANAGEMENT AND PLACEMENT OF PROJECT TEAMS

Section three has three chapters. In Chapter 6, Min An and Hesham S. Ahmad focus on "Knowledge Management in Construction Projects: A Way Forward in Dealing with Tacit Knowledge." Knowledge is now becoming the most valuable asset of the construction organizations to gain competitive advantages by reducing cost and time while improving the quality of projects. Construction projects are in knowledge-intensive environments where many interrelated components work together in a complex manner. Knowledge Management (KM) is the most effective way to deal with the intellectual capital of the organizations through facilitating the capturing and sharing of existing knowledge and creating new innovative knowledge. The most useful knowledge in construction projects is tacit knowledge. Tacit knowledge is personal and exists in individuals' heads and memories in the form of experiences and know-how. However, in many circumstances, tacit knowledge is not easy to be shared and re-used to improve experiences and enhance abilities of employees for problem-solving and decision-making. These situations call for a method of managing such knowledge to solve construction problems and achieve a high quality of construction projects. Many of methods have been adopted to deal with knowledge in the construction organizations, but in any case, they are still far from enough since most KM models only provide a communication platform and much creative knowledge work still depends entirely on human activities.

This chapter provides an overview of the classification of data, information, explicit and tacit knowledge. This classification will help organisations identify the types of knowledge with different nature that may need different procedures, tools and methods to process and manage. Subsequently, by exploring the main challenges of KM implementation in construction organisations the chapter reviews and discusses problems of current approaches of managing tacit knowledge. In order to distinguish the differences in nature and processing procedures for the different types of knowledge, a novel KM methodology to facilitate understanding, implementing, and applying a KM system in the organisations is presented in this chapter with a particular emphasis on dealing with tacit knowledge in construction projects, which covers identifying knowledge resources, knowledge processing, identifying processing resultants, IT and non-IT tools in order to enhance the implementation and application and effectively assess the overall performance of the KM system. Then a case study is used to demonstrate its importance and usefulness of this KM methodology in the construction industry. The chapter concludes with a consolidated overview of a method and procedure for better understanding, dealing with, and benefiting from the dynamic nature of knowledge, which helps the organisations capture, share, and manage knowledge effectively and efficiently.

Marcos Ruano-Mayoral, Ricardo Colomo-Palacios, Ángel García-Crespo, and Juan Miguel Gómez-Berbís deal with "Software Project Managers under the Team Software Process: A Study of Competences Based on Literature" in Chapter 7. The authors present an interesting approach to identify the competencies for software project managers. Given that competency is the ability of an individual to perform a job properly, this work is interesting for both practitioners and researchers alike. Instead of identifying competences through job analysis or task analysis, the authors did a remarkable work in which they review the Team Software Process (TSP) literature to highlight skills, attitudes and knowledge components. This componential profile of the team leader role in TSP can be considered pioneer in the software engineering management scenario. This study identified "Work quality as a challenge" as the most cited skill followed by "Combine forces," "Maintain team communication;" and "Identify key issues"; "Job facilitator" as the most important attitude followed by "Collaborative leadership," "Respect," and "Commitment"; and finally, "Build and maintain an effective team," as the most cited knowledge component followed by "Lead risk evaluation and tracking," "Participate in the configuration control board," and "Handle funding issues."

In this work, this group of researchers from Universidad Carlos III de Madrid, Spain, compares obtained results with the Guide to the Software Engineering Body of Knowledge and the Project Management Body of Knowledge Guide models in order to provide a comparative with the most important initiatives present in the literature. The work discovers that TSP literature is more focused on the definition of skills and attitudes than in dealing with knowledge components. The importance of this work lays on the intrinsic relevance of the TSP, a set of practices that lead software engineering teams that are developing software-intensive products to reach a disciplined engineering practice. The lack of the definition of the components that comprise competency constitutes a challenge for software development organizations that use TSP, whose project managers should confront the task with full capacities, and without the help of established and recognized competencies. The main conclusion of the work is that the style of management enabled by TSP permits the team leader to concentrate on aspects such as the management of human resources, delegating some others, such as the management of quality, to team members.

In Chapter 8, Sadan Kulturel-Konak, Clifford R. Maurer, and Daniel L. Lohin show "Teaching Students How to Effectively Work in Virtual Teams." A virtual team (also known as a geographically dispersed

team) is a group of individuals who work across time, culture, space, and organizational boundaries using webs of computer-mediated communication (CMC) systems. Geographic distance typically precludes face-to-face (FtF) interaction and has impacts on a team's task processes as well as its socio-emotional processes. Meanwhile, virtual teams in the workplace are becoming increasingly popular. Educators understand the need to prepare students for working in virtual teams. However, although knowledge about the challenges of virtual communication and virtual team work is increasing, there is still need for more work focusing on the teaching strategies in order to enhance students' virtual team literacy.

This chapter first reviews related prior work emphasizing the importance of virtual teams as skills to be addressed by undergraduate education. Then, through the voices of two professors and a student, the chapter describes an educational experience that exposed students to virtual teams constructed between Information Technology Project Management classes of two branch campuses of the Pennsylvania State University. At both campuses, students had the opportunity to form nucleus teams (i.e., subteams) with people of their choice. Subteams were then matched to form the geographically dispersed teams. This experience focused on overcoming the communication problems of virtual teams in order to strengthen team building dynamics. Students experienced that they should not have expected the dynamics to be the same as if everyone were in the same room. Professors designed assignments so that students interacted with team members in the other location since it could be tempting to focus only on those in the same location (i.e., their own campus) with them. Another variable to be in focus was the building of trust in virtual teams. The problem to be solved by the virtual teams concerned a growing company that had experienced growth but also recognized that it had problems due to a lack of consistent adaptation of technology within the organization.

Students were given surveys before and after this virtual team project experience. The results indicate that initially many students were very apprehensive about virtual teams; however, after completing the course, most students expressed positive attitudes and a general understanding of techniques to work effectively in virtual teams. In addition, almost all teams commented on how important they felt virtual teams would become in the future as digital technology continues to improve.

ACQUIRING MANAGERIAL EXPERIENCE

Section four contains four chapters. In Chapter 9, Adedeji B. Badiru stresses "Half-Life of Learning Curves for Information Technology Project Management." It is a natural process for people to learn, unlearn, and relearn. Capturing this process in a quantitative framework is essential for making effective decisions in any operation, particularly in an information technology environment, where human-machine interfaces are common. Because the degradation of learning does not follow a linear path, it is essential to monitor the various stages of the learning, unlearning, and relearning processes. This is exactly what the chapter on half-life of learning curves presents. The methodology presented in the chapter is new and innovative. The chapter presents an excellent analytical modeling of the stage when a learning profile has degraded to half of its initial value. This is useful for predicting the magnitude and behavior of learning over time. The author did an excellent job of pointing out that the half-way point is of most interest in tracking the degradation path of learning. That half-life point can be used for project planning and control purposes.

With the techniques in this chapter, something similar to a breakeven analysis of learning can be done because the upswing of learning and the downswing of learning conceptually intercept at some

point. It is of decision interest whether that interception point occurs before or after the half-life point. For the purpose of training in information technology operations, an organization can use the half-life computational technique to estimate what fraction of training retention remains after some point in time and what level of retraining might be needed. Practitioners often speak of "twice as much" and "half as much" as benchmarks for process analysis. In economic and financial principles, the "rule of 72" refers to the length of time required for an investment to double in value. These common "double" or "half" concepts provide the motivation for using the half-life properties of learning curves as presented in this chapter. The longer the half-life of a learning curve, the more stable it is. This innovative chapter provides a good analogy for modeling learning curves with the recognition of increasing performance or decreasing cost with respect to the passage of time. Useful definitions from the chapter are: "Half-life of a learning curve is the incremental production level required to reduce cumulative average cost per unit to half of its initial level." "Half-life of a forgetting curve is the amount of time it takes for performance to decline to half of its initial level."

In Chapter 10, Hazel Taylor and Jill Palzkill Woelfer analyze "Critical Behavioral Competencies for IT Project Managers: What Are They? How Are They Learned?" The authors acknowledge the need to improve the performance of IT projects and the role of behavioral competencies of IT project managers in project outcomes. The chapter begins with a review of research related to project management skills and an in-depth discussion of the competencies described in general management and project management literatures, to provide a starting point for examining skills required specifically for IT project management. Potential avenues for learning these skills are discussed. From this background in the literature, the authors ask, "What behavioral competencies do experienced IT project managers apply when facing critical situations in their projects, and how have they developed those competencies?"

Through the analysis of data gathered in interviews with 23 experienced IT project managers, the authors identify the most important behavioral competencies of IT project managers and the ways that these managers have learned these skills. From this analysis, the authors make two primary contributions. The first contribution takes the form of an empirically derived set of specific behavioral competencies that are important for managers of IT projects with team leadership, concern for order, quality and accuracy, relationship building, impact and influence, and organizational awareness being most important. The second contribution relates to the learning methods used by IT project managers and formal development interventions that IT project managers have experienced. The most frequently employed learning methods are reflection on experience, observation of other project managers, formal training, and working with a coach or mentor. IT project managers also encountered a number of development interventions such as formal project management training, other management training, performance appraisals, participating in communities of practice, coaching and mentoring, and 360-degree feedback.

The authors present two key findings related to these learning methods and development interventions. First, although formal project management training provides a foundation for the development of IT project management skills, many of the IT project managers interviewed did not receive formal training until later in their careers. Second, IT project managers often employ self-reflection as a learning method and persist in seeking out new learning opportunities throughout their careers. Thus, the opportunity exists for organizations to foster life-long learning among IT project managers by providing a situated learning environment wherein junior project managers take part in formal training early in their careers and then receive feedback while being encouraged to reflect on their practice. Building

on the work presented in this chapter, the authors are currently pursuing a follow-up study to develop a validated model of behavioral competencies for IT project managers.

Chapter 11, entitled "Questioning the Key Techniques Underlying the Iterative and Incremental Approach to Information Systems Development," was written by Angus G. Yu. The iterative and incremental development (IID) approach is widely promoted and adopted in information systems development (ISD) projects. While the IID approach has played an important role in the management of many ISD projects, its key techniques have not received critical appraisal from the academic community. Through a case study, this chapter fills the gap and examines three techniques of user participation, to evolutionary prototyping and timeboxing that are common to many IID methodologies.

First of all, the gap between the theory of user participation and the reality of user's lack of real influence on design and development is explored. While acknowledging behaviour-based explanations for difficulties caused by user participation, the chapter introduces an alternative structural explanation based on the concept of participatory capture within the agency-theoretic framework. This is significant since the new explanation not only explains the side effect of user participation, it points to a structural solution to issues that seem to be inherent in the user participation process. Secondly, with regard to evolutionary prototyping, the chapter suggests that its underlying assumption of converging and converging to success is problematic. As a result of the assumption, the IID approach in general does not provide a strategy to deal with the risk of the converged solution not meeting client requirements. Thirdly, the technique of timeboxing is considered. The chapter highlights its bias toward the supplier without adequately considering the needs of the client. The use of the timeboxing technique is likely to result in the supplier providing a system with less functionality and lower quality without proportionally reducing the client's cost.

The study is relevant to the on-going evaluation of agile methodologies incorporating similar techniques. It is also relevant to the broad question of how to deal with the significant uncertainties in ISD projects. The chapter finishes by referencing an existing framework of categorising product development strategies into instructional, learning, and selectionist approaches. It is suggested that IID represents the learning approach, which is a step forward from the instructional approach. However, the chapter postulates that to overcome the significant client-supplier and developer-user information asymmetry and development uncertainties, there is a need to incorporate the "selectionist" approach in ISD project methodologies.

Sanne Bor and Kees Boersma study the "Processes in R&D Collaboration" in Chapter 12. The chapter examines the process leading to a formalized co-operation of innovation in two cases: TechStar, and SciNet. Both cases were Research and Development (R&D) collaborations selected for funding by the European Commission (EC) under Framework Programme Six (FP6). In order to be eligible for the funding, the two cases needed to formalise their collaboration, whereby both the organisation of the collaboration as well as the activities were put into contracts, the consortium agreement and the contract with the EC.

The participants interviewed in TechStar reflected rather negatively on the formalisation process demanded by the EC. They reported that the formalisation process was unnecessary in that their research would have been done in the same way without the consortium agreement and contract, and that the demands of the EC were burdensome and bureaucratic. The participants of the other case, SciNet, on the other hand reflected positively on the formalisation process demanded by the EC. They reported that it was demanding, but that the contract and agreement help in understanding what is expected from them and how decisions should be made, and that the process helped in better understanding how they can work together with the other partners.

In order to understand this difference, Bor and Boersma illustrate how during the process of formalising, these two cases differ in the way that they use the formalisation process for simultaneously creating a better understanding of the collaboration, the expectations and the partners. The concept of sensemaking is used to grasp this possible sequential process of increasing of understanding by participants of their relationship with the other participants, their own role and responsibility and those of the others as well as the possibilities of collaborating due to better understanding what each participant is doing, interested in doing and capable of doing. The authors argue that using the formalisation process for simultaneous sensemaking adds value to the collaboration as well as can help in creating success of the collaboration due to the participants having a better understanding of the whole, the partners, and process.

The authors identify five factors that encourage or discourage the partners to use the process of formalising for the purpose of sensemaking: 1) the network configuration, 2) the extent to which partners already know one another, 3) the similarity of the partners, 4) the dependence of the partners on one another, and 5) the attitude towards formalisation. The authors urge practitioners to see formalisation not as an end in itself, but as a means for sensemaking. The authors believe this will lead to a situation in which the innovation process is supported by the different participants, problems will be able to be solved more easily, and this will lead to a more efficient innovation process.

PROJECT OUTCOMES AND CONCEPTION OF SUCCESS

Section five covers three chapters. In Chapter 13, Jack Shih-Chieh Hsu, Houn-Gee Chen, James Jiang and Gary Klein highlight "The Role of User Review on Information System Project Outcomes: A Control Theory Perspective." For quite a few years now it has been assumed that having users participate in the development of an information system will improve the outcomes of a development project. However, past research shows that participation by users has at best minimal impact. The authors take the challenge of determining why the wisdom of practice does not garner much research support. The authors contend that the contingency perspective taken by researchers does not consider the type of influence required for users to have an impact on final project outcomes.

Basing a model on contingency theory essentially forces actions to be taken based on task needs. This is obviously a valid consideration, but the actions taken could be done by any party without broad influence. Thus, should a user conduct an activity for the sake of participation, there is no structure to influence the outcome of the system as a whole, being limited to the scope of a particular task.

The authors of this study contend that this approach does not allow the necessary influence over the project at large. Instead, the authors alter the traditional view of user participation by drawing on control theory. This change in perspective allows for those in control to wield influence over a broader project scope. Under this assumption, the users become controllers as participants rather than as performers of a limited number of tasks. This assumption is a unique contribution to the field of information technology project management.

To refine the proposition, the authors consider the function of system reviews by users. The greater the intensity and frequency of reviews, the greater the opportunity the users have to influence the outcome of the project. The caveat in this situation is that the users and developers be effective in communicating their ideas and concerns to one another. Thus, the role of the user is elevated from one of conducting tasks within the project to one of potentially altering the path the project will follow. This increases the influence a user has to a greater extent than task completion.

Based on this logic, the authors then test the proposition. A sample validates the model indicating that participation as a controller explains a substantial portion of the success achieved by an IT project. This significant work by the authors of this study indicates researchers should consider control aspects in future models, but more importantly indicates how managers of technology projects should work to position users to have an ability to influence outcomes rather than perform a limited number of tasks.

Michael J. Cuellar prefers "Using Realist Social Theory to Explain Project Outcomes" in Chapter 14. The author takes on a significant issue in project management: Why did the project turn out the way it did? To address critical issue, Dr. Cuellar's contribution is to provide a methodology to apply Archer's Morphogenetic Social Theory, a general sociological theory whose key concern is to identify the reasons for change or non-change in social structures, to the problem. This is particularly appropriate for IT project management as IT projects are inherently social activities whose goal is the creation and/or implementation of IT artifacts.

In Archer's theory, social structures are held to be relationships between roles, which are positioned sets of practices such as a business process or organization. In any change effort such as an IT project, the different groups associated with the project (agencies) have different perspectives (situational logics) toward the existing social structures and the change effort. Additionally, resources such as money, expertise, and sanction are variously distributed amongst the agencies. When an agency begins an effort to make change, the agencies interact and in the process, they are defined and realigned, and resources are redistributed. On the basis of the realigned resources, the social structure is either transformed or not on the basis of mutual agreement, negotiation, or power imposition depending on the negotiating strength of the parties.

To use this theory for explaining project outcomes, first the author identified the social structure for which he wished to explain how it changed or did not change. Then data must be collected on the existing social structures and agencies, a history of interaction and negotiations around the resulting form of the social structure. Finally, the author analyzes the contractions within the structure, the resources available to the agencies and their situational logic. From the history, the chapter examines the strategies and tactics that they used to accomplish their goals. Finally, there is a power analysis of the negotiation. This drives out the causal factors explaining the results of the change activity.

This methodology provides the macro- and micro-level concepts that become the explanatory engine for identifying why the project achieved the results that it did. In so doing, the author balances structures and agencies not giving priority to either but allowing for identifying the dynamics between them. For practitioners, this approach allows them to understand the strengths and weakness of their social position prior to beginning a development or implementation effort and take steps to improve the chances of success. An example case study is provided to illustrate this methodology.

In Chapter 15, M. Keith Wright and Charles J. Capps offer "Runaway Information Technology Projects: A Punctuated Equilibrium Analysis." This wonderfully detailed case study presents a rarely seen inside view of a runaway Information Systems (IS) project in a(n) (unidentified) U.S. State government agency. Such out of control projects have been repeatedly shown to be one of the most egregious sunk costs in the global economy. This agency was targeted because it was well known as one of the most inefficient healthcare related agencies in the U.S. The principal investigator (PI) had a unique perspective; being both an academic and a certified IS auditor, he got permission from the agency's Director of Internal Audit (IA) to perform the project monitoring function for a long-troubled IS project in return for collecting research data.

The resulting ethnographic project narrative contained herein precisely chronicles how that project went out of control for so long, and because of this unique hybrid practitioner-academic perspective, the accompanying case study adds many new details to the IS project escalation literature. The chapter clearly explains the over-simplification in existing popular models of IS project escalation and de-escalation, and illustrates how a punctuated equilibrium analysis can be a more fruitful predictive tool than are "stage models," which are based on temporal processes.

Many important insights emerge from this case study. It suggests that project escalation should be expected to occur in most large IS projects and that when it does, it will do so in a manner consistent with that of an organization in "equilibrium." This indicates that future models of the escalation/de-escalation process should focus less on "projects" and more on the life cycle of the underlying business problem. The study raises the following specific research questions: What are the most important organizational choices forming the "deep structure" of information systems (IS) project organization? Are U.S. State government IS projects more prone to escalation than projects elsewhere? How can large organizations be structured to prevent project escalation? What are the factors governing when IS project redefinitions are used mainly for political purposes rather than to address real business problems? What are the factors governing when an IS project can be de-escalated without "revolutionary" organizational change? How do IS projects function during revolutionary periods? How do IS project revolutionary periods conclude? How is an organization's perception of its self-efficacy related to IS project escalation? The chapter cleverly illustrates benefits that can result when academia partners with the professional IS audit community.

IMPLEMENTATION OF IT PROJECTS FOR COMMERCIAL ENVIRONMENT, AGENCIES AND GOVERNMENTS

With four chapters, section six concentrates on "Implementation of IT Projects for Commercial Environment, Agencies and Governments." In Chapter 16, Andrew P. Ciganek and Marc N. Haines introduce "Service-Oriented Architecture Adoption: A Normative Decision Model for Timing and Approach." Successful project managers seek best practices and process improvements. This chapter introduces a normative decision model that reveals the most salient factors helping project manager to determine the appropriate timing and approach for adopting or expanding a Service Oriented Architecture (SOA) based on Web services. As SOA is becoming more entrenched as an architectural paradigm for information systems, organizations are expanding the scope and sophistication of SOA deployments. Questions of how and when to move ahead with SOA initiatives are as pertinent today as in the earlier days of SOA.

IT practitioners should pay particular attention to the decision flow representing the key questions and possible actions necessary for moving forward with SOA. The normative decision model offers direct guidance leveraging multiple best practices identified by adopters of SOA. There are four main areas an IT manager needs to assess to determine when and how to go ahead with a SOA project: the maturity of relevant standards, the technology gap, the organizational gap, and the nature of the benefits expected from a SOA. The authors provide specific instructions for practitioners based on the decisions that IT managers make in these four areas for the timing, scale, and usage of services.

The authors' seminal work examining SOA should help guiding both practitioners and researchers as the literature on the topic of SOA matures. The multiple case study approach used in this chapter proved to be appropriate for shedding greater insight into the complex nature of adopting SOA. A semi-

structured interview script with eight open-ended questions was used during the interview process. This approach ensured consistency among all interviews and addressed the firm's organizational and IT background, the perspective and involvement of the interviewee, current SOA initiatives, expected benefits, the key challenges, long-term solutions and temporary workarounds, as well as key lessons learned in dealing with a SOA.

Scientific theory examining SOA is still maturing, and the authors offer an important contribution to this growing field in the literature. The authors interviewed multiple individuals from eight organizations in this study. These organizations represented varying levels of SOA adoption in multiple industries which gave a more balanced and comprehensive representation of the challenges organizations faced, attesting to the study's rigor. Researchers are encouraged to expand upon this work by either validating the findings through an independent study, examine SOA adoption for latter adopters, or refine the authors' normative decision making model using a similar, rigorous methodological approach.

In Chapter 17, Rugayah Hashim checks the "Issues in Electronic Procurement Project Implementation in Local Government." Electronic procurement was one of the first pilot projects implemented under the Malaysian e-government flagship in 1997. Till today, the e-procurement project has not been fully and successfully implemented because of several glitches and issues. Within the scope of local governments in Malaysia, eighteen pertinent issues were identified; namely, inter-departmental coordination, organizational directives, existing system or legacy system, organizational support, written procedures, planning model, organizational ICT expertise, organizational culture, individual support, leadership, strategic planning, individual ICT expertise, financial and budgeting issues, internal and external politics, standardization, timeframe and scheduling issues, human resources, and finally, adequate staffing. By converting these issues into a checklist, local government administrators would be able to ameliorate problems synonymous with project management resources such as extended timeframe and budget.

In addition, addressing these common barriers to successful e-procurement rollout would result in a significant return of investments for the federal, state and local governments. Furthermore, the Malaysian government is insistent that all public service delivery systems maintain a high standard of efficiency, effectiveness, integrity and accountability. With e-procurement, the transparency involved with government tenders and biddings would eliminate bribery among the vendors or suppliers and the civil servants working in the procurement department. Reforms in local authorities' administrative functions are crucial to the government's machinery, particularly the third tier of government as they are the ones that work closely with the grassroots, a.k.a., the citizens. Moreover, local authorities have limited resources, especially skilled manpower and money; thus, these constraints further inhibit the implementation of a sophisticated system project. Within these two realms, if the local authority leadership is weak and lacks the ICT expertise or know-how on e-procurement, the failure of the project is doomed from the start.

Nevertheless, inter-departmental coordination issues need to be eliminated as information sharing should not be provincial in nature. As such, organizational directives have to be similar or parallel, and the tasks of ensuring the integration of entity goals lie heavily on a strong and competent leader. Since e-procurement is rather contemporary, local authorities with legacy systems would need to update their computer peripherals for proper system integration. This would require organization support by letting the immediate department authorized to implement the e-procurement system have access to new equipment, and a skilled and adequate number of staff. Once the internal and external politics are taken care of, the success of e-procurement implementation and usage are ensured.

Chapter 18, entitled "Establishing Preconditions for Spanning the Boundaries in Public Private IT Megaprojects," was written by Roman Beck, Oliver Marschollek, and Robert Wayne Gregory. In recent

decades, public-private partnerships (PPP) gained increasing attention for realizing public infrastructure projects. Due to different interests and corporate cultures of public sector and private sector organizations, the realization of infrastructure projects in the context of a PPP often causes collaboration difficulties, which lead to cost and time overruns. Therefore, this chapter focuses on exploring how the failing course of action of a public-private IT megaproject can be stopped and how the project can be turned around successfully. Based on the theoretical insights of boundary spanning literature, this chapter examines how public sector and private sector differences can be overcome to bridge the cultural divide in IT PPP projects. In particular, the analysis sheds light on the organizational preconditions for and activities of boundary spanning to reestablish a previously violated public-private relationship.

The analysis shows that the organizational preconditions of boundary spanning consist of establishing an unbiased relationship with the stakeholders, expertise in both fields of practice for developing mutual understanding, and the power to enforce changes in collaboration practices. Establishing these preconditions could only be realized by installing IT PPP managers with an unbiased relationship to the partnership project, which need to be familiar with the different cultural environments and possess the formal power to enforce changes in governance structures. In addition, it became evident in the analysis that specific activities are necessary to actively span the boundaries for reestablishing a sustainable partnership and turn around the project's course of action. In order to reestablish the partnership relation and mutual trust between the parties, partnership employees need to be shielded from external influences, such as media cover stories. Thereby, an open communicative culture can be maintained, which enables understanding mutual expectations and negotiating compromises on project realization.

Closer collaboration within the partnership and with all stakeholders as well as an increasing belief in project success was also supported by continuous external stakeholder support, such as positive announcements of politicians and transport associations in public media. Summing up, turning around troubled IT PPP projects necessitates establishing an unbiased relation between public and private parties and continuously nurturing the partnership relation as well as all stakeholder relations. Using boundary spanning theory, this chapter adds to the extant literature by identifying the antecedent conditions for and the activities of boundary spanning on an organizational level to bridge the cultural divide in inter-organizational cooperation's.

Silvana Trimi and Kozeta Sevrani summarize "Development of M-Government Projects in a Developing Country: The Case of Albania" in Chapter 19. Albania is a Balkan former communist country, which has been striving to overcome obstacles toward its goal of joining EU and improving its citizens' life. However, recently the nation seems to have stagnated. Allegations of corruption have tainted every election since 1992 and politics seems to roll from one crisis to next because of the constant battle between the two major political parties. Every election's results have been disputed, parliament has been boycotted, fingers pointed both ways, and neither is showing any willingness to put the country before their political and self-interests. Institutions are weak, and laws are very often ignored. Bribes and corruption have penetrated in all levels of the government. The government is not transparent even for the impact of the global financial crisis on the country. Citizens are unhappy with the levels of corruption, lack of transparency, and the speed of progress toward an advanced country. The political turmoil is damaging Albania's EU accession process as EU requires applicants to be well-functioning democracies.

Today, information and communication technologies (ICTs) are used innovatively by governments worldwide to conveniently and economically deliver services, engage citizens, and increase transparency. The Albanian government also has successfully initiated and developed several e-government services. Many e-government projects, even when designed successfully, are canceled or not fully utilized because of the lack of awareness and/or lack of technologies (network infrastructure and access devices) to access

these services, a problem quite prevalent in most poor countries. In Albania, fixed-line infrastructure is still very poor, particularly in rural areas. The majority of population has no desktop access to the Internet. However, they do have wireless access, with a penetration of around 90%. Thus, the best and perhaps the only way to serve citizens and businesses with timely and locality-based information, perform transactions, participate in decision making, and increase transparency is through m-government applications.

In this chapter, the authors develop the point of importance in introducing m-government applications in Albania, the types and the benefits to the users (individuals, businesses, and government) and to the country's progress toward democracy. The Albanian government not only should start designing m-government applications, but it should also make them a priority because: (1) e-government is still at early stages, and synergy between the two (e- and m- services) can be explored and duplications avoided; and (2) m-government can be the only, the quickest, the easiest, and most efficient way to provide government services, increase transparency, and citizen-participation, thus helping the country to get out of its stagnation and progress toward democracy and EU integration.

John Wang
Montclair State University, USA

Richard Peterson
Montclair State University, USA