

VOLUME 7

Cases on Information Technology

LESSONS LEARNED

MEHDI KHOSROW-POUR

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Cases on Information Technology: Lessons Learned Volume 7

Mehdi Khosrow-Pour, D.B.A.
Information Resources Management Association, USA



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Preface

Insight into successful IT implementation assists researchers and professionals in determining factors of success, as well as causes of failure, in information technology applications and projects. Case studies have proven to be excellent sources of lessons learned for information technology users and designers. Within the 31 real-life case studies included in this book, *Cases on Information Technology, Lessons Learned, Volume 7*, many IT researchers and professionals from around the world have written of their valuable, real-life IT experiences in IT utilization and management in modern organizations and universities. Each case includes integral information regarding organizations working with IT, including key individuals involved, intelligent steps taken or perhaps overlooked, and the final project outcomes. These cases cover a variety of IT initiatives, including enterprise systems, wireless technologies, rebuilding operating systems after destruction, and implementation within non-profit organizations. IT managers and researchers will find this volume useful as it describes various scenarios of IT implementation and also unfortunate downfalls. Using the real-life situations as facilitators for classroom discussion, professors and students will benefit as well from this collection of cases. Following are summaries of the cases contained in this volume.

The first case study, “An Experiential Case Study in IT Project Management Planning: The Petroleum Engineering Economics Evaluation Software Imperative, by Charles K. Davis, describes an organization’s need for a complex software package internal development. This operational and functional situation provides a framework for developing a set of project plans for a software development project to address these needs. The goal of this case is to develop a detailed project plan, including schedules, staffing, and deliverables by task, and cost estimates.

The second case study, “The Algos Center: Information Systems in a Small Non-Profit Organization”, by Susan J. Chinn, Charlotte A. Pryor, and John J. Voyer, describes an analysis of information systems conducted for a small non-profit organization. The case highlights many of the problems facing small non-profits and allows readers to supply possible courses of action. In addition, it provides an opportunity to evaluate how a consulting experience was handled.

“Social Construction of Information Technology Supporting Work” by Isabel Ramos and Daniel M. Berry describes the social dynamics shaping the implementation and deployment of the MIS systems supporting a company’s production processes

and the procurement of resources for these processes. The case study describes in particular the stakeholders and the organizational relationships between them; the stakeholders' formal and informal roles; the information needed from and provided to the systems, the stakeholders' views of the systems' usefulness, quality, and flexibility; the stakeholders' career paths; and the stakeholders' perceptions of their own and others' worth to the company.

German public hospitals face governmental and regulatory pressures to implement efficiency and effectiveness metrics, such as the classification of Diagnosis Related Groups (DRG) system, by the year 2005. "CRM Systems in German Hospitals: Illustrations of Issues & Trends" by Mahesh S. Raisinghani, E-Lin Tan, Jose Antonio Untama, Heidi Weiershaus, Thomas Levermann, and Natalie Verdeflor describes customer relationship management technology and the challenges of data sharing and data security in hospitals. Finally, the benefits accruing to the hospitals are identified, along with strategies to focus on efficiency and customer satisfaction in a very competitive market.

Discussing the challenges facing the Health Board enterprise system implementation team in dealing with a necessary IT platform change before the system go-live, "The Selection of the IT Platform: Enterprise System Implementation in the NZ Health Board" by Maha Shakir and Dennis Viehland presents issues pertaining to the initial choice of IT platform, the failure of the platform to meet contractual specifications, and the challenges the project team faced in resolving this problem.

Building cars to customer order has been the goal of vehicle manufacturers since the birth of mass production. Despite recent advances in information technology offering total visibility and realtime information flow, transforming a high volume manufacturing industry to adopt customer responsiveness and build-to-order represents a significant step. "Automotive Industry Information Systems: From Mass Production to Build-to-Order" by Mickey Howard, Philip Powell, and Richard Vidgen explores the barriers to change within and between stakeholders at all levels of the supply chain.

Exploring the political relationships, power asymmetries, and conflicts surrounding the development, deployment, and governance of IT-enabled sales and marketing information systems (IS) at Digital Devices Inc. allows this case to provide rare insights into the reality of IS development and IT infrastructure deployment. "Power Conflict, Commitment, & the Development of Sales & Marketing IS/IT Infrastructures at Digital Devices, Inc." by Tom Butler focuses on an in-depth description of the positive and negative influences on these processes and their outcomes.

"Development of an Information Kiosk for a Large Transport Company: Lessons Learned" by Pieter Blignaut and Iann Cruywagen discusses the development of an information kiosk system for a large public transport company to provide African commuters with limited educational background with up-to-date information on schedules and ticket prices in a graphically attractive way. The challenges regarding liaison with passengers are highlighted and the use of a touchscreen kiosk to supplement current liaison media is justified.

"A Case of an IT-Enabled Organizational Change Intervention: The Missing Pieces" by Bing Wang and David Paper documents an organizational change intervention concerning the implementation of a novel information technology (IT) at a university-owned research institute. It describes disparate experiences by key actors toward the intervention, marking a mismatch between a new paradigm and the existing IT culture. In particular, resistance from in-house IT specialists was observed as the strongest force obstructing the novel IT implementation.

A college of business computer server room was completely destroyed by a fire. “Up in Smoke: Rebuilding After an IT Disaster” by Steven C. Ross, Craig K. Tyran, David J. Auer, Jon M. Junell, and Terrell G. Williams discusses the issues the college faced as they planned for rebuilding their information technology operations. The reader is challenged to learn from this experience and develop an IT architecture that will meet operational requirements and take into account the potential threats to the system.

“From Principles to Practice: Analyzing a Student Learning Outcomes Assessment System” by Dennis Drinka, Kathleen Voge, and Minnie Yi-Miin Yen describes the challenges facing a system project manager. The system supports the assessment of student learning and documents and tracks course content documents. In order to move into the design phase, the business objectives must be identified, a system development life cycle approach and development platform selected, project risks identified and assessed, and resources secured.

“Challenges of Complex Information Technology Projects: The MAC Initiative” by Teta Stamati, Panagiotis Kanellis, and Drakoulis Martakos provides a detailed account of the ill-fated Management and Administrative Computing (MAC) that aimed by the homogenization of requirements to centrally procure an integrated applications suite for a number of British higher education institutions. In this context the case illustrates the level of complexity that unpredictable change could bring to an information technology project that seeks to realize the impossible dream of the ‘organizationally generic’ and the destabilizing effects it may have on the network of the project’s stakeholders jeopardizing the project’s success in an irreversible manner.

Many world-class organizations are now employing a new breed of systems known as Learning Management Systems (LMS) to foster and manage learning within their organizations. “Beyond Knowledge Management: Introducing Learning Management Systems” by Audrey Grace and Tom Butler reports on the deployment of an LMS by a major U.S. multinational and proposes a framework for understanding learning in organizations, which highlights the roles that LMS can play in today’s knowledge-intensive organizations.

“A Case of Information Systems Pre-Implementation Failure: Pitfalls of Overlooking the Key Stakeholders’ Interests” by Christoph Schneider and Suprateek Sarker focuses on the software vendor selection process at a large public University which failed even before implementation could get under way, as the managers in charge of the project overlooked procedures as outlined in the RFP and the roles of relevant but “hidden” decision makers during the pre-implementation stage of the project.

The National Aeronautics and Space Administration has had unprecedented success with historic space missions, including the development of the Space Shuttle. When the Challenger exploded, investigations called for NASA to examine its culture. Twenty years later, with the Columbia shuttle disaster, some of the same questions are being asked. “The Columbia Disaster: Culture, Communication, & Change” by Ruth Guthrie and Conrad Shayo discusses the problem of relaying complex engineering information to management, in an environment driven by schedule and budget pressure.

“New Forms of Collaboration & Information Sharing in Grocery Retailing: The PCSO Pilot at Veropoulos” by Katerina Pramataris and Georgios I. Doukidis describes a pilot implementation utilizing Internet technology in order to enable collaboration and daily sharing of POS data between grocery retail stores and suppliers with the objective

to streamline the store replenishment process. This effort resulted in significant business results but at the same time several pitfalls and technical challenges, as described in the case.

Describing the development and implementation of a knowledge-based policing system, “Information Technology in the Practice of Law Enforcement” by Susan Rebstock Williams and Cheryl Aasheim, discusses how the system enables information regarding incident reports, arrests and investigations to be collected, distributed and managed in a paperless, wireless environment. The challenges faced in merging wireless, wired, database, and application technologies while satisfying the user requirements of the police department are detailed in this report.

“End-User System Development: Lessons from a Case Study of IT Usage in an Engineering Organization” by Murray E. Jennex looks at a study of end user computing within the engineering organizations of an electric utility undergoing deregulation. The case was initiated when management perceived that too much engineering time was spent doing IS functions. The case found that there was significant effort being expended on system development, support, and ad hoc use. Several issues were identified affecting system development including use of programming standards, documentation, infrastructure integration, and system support.

The value of information depends on the quality of that information, when it is required and the purpose to which it will be put. “LIBNET: A Case Study in Information Ownership & Tariff Incentives in a Collaborative Library Database” by A.S.C. Hooper investigates the principles driving pricing issues and information ownership in a cooperative database. The perspective of selected members provides insights into the strategic outcomes for the organization.

“Information System for a Volunteer Center: System Design for Not-For-Profit Organizations with Limited Resources” by Suresh Chalasani, Dirk Baldwin, and Jayavel Souderpandian focuses on the development of information systems for the Volunteer Center of Racine (VCR). This case targets the analysis and design phase of the project using the Unified Modeling Language (UML) methodology. It also discusses project management, team dynamics, projects risks and solution-alternatives in detail.

The issues surrounding the pending expansion of Siemens’ community-based knowledge management system ShareNet to the research and development function are described in “Siemens: Expanding the Knowledge Management System ShareNet to Research & Development” by Hauke Heier, Hans P. Borgman, and Andreas Manuth. Information systems implementation issues, as well as change management interventions, are discussed. Particular emphasis is placed on motivation factors for end users, user champions, and top management.

“Enterprise System Development in Higher Education” by Bongsug Chae and Marshall Scott Poole study describes a major U.S. university system’s experience in the development of an in-house enterprise system. This case indicates that ES design and implementation in higher education is challenging and complex due to unique factors in the public sector. It offers some unique opportunities to discuss issues, challenges and potential solutions for the deployment of ES in the public arena, particularly in higher education.

Changing company’s sales and production strategy from “make-to-order” to “make-to-stock” required a complete redesign of the planning system, which was an integral part of an ERP system based on SAP software. “ERP Implementation for Production Planning at EA Cakes Ltd.” by Victor Portougal describes the organization and

its management practices and specific problems solved by the consulting team. Finally, it identifies the enhancements management obtained as a result of the implementation of ERP.

“MACROS: Case Study of Knowledge Sharing System Development within New York State Government Agencies” by Jing Zhang, Theresa A. Pardo, and Joseph Sarkis reports the development of a knowledge sharing system that fosters knowledge sharing across divisions and levels of government in a New York State agency. It describes in detail the project management tools and models used in various stages to aid the analysis and the development of this project. Finally, ongoing challenges and barriers are outlined.

“Adoption & Implementation of IT in Developing Nations: Experiences from Two Public Sector Enterprises in India” by Monideepa Tarafdar and Sanjiv D. Vaidya describes IT adoption issues at two large public sector organizations in India. In addition to illustrating the significance of top management drive and end-user buy in, it particularly highlights the role of middle management in managing the IT adoption process at different levels in these large organizations.

“IT-Business Strategic Alignment Maturity: A Case Study” by Deb Sledgianowski and Jerry Luftman describes the use of an assessment tool that can help to promote long-term IT-business strategic alignment. The Strategic Alignment Maturity (SAM) assessment is used as a framework to demonstrate the improvement of an international specialty chemicals manufacturer’s IT-business alignment practices to achieve their corporate goals. Major insights from their experience and SAM best practices are highlighted.

“Experiences from Using the CORAS Methodology to Analyze a Web Application” by Folker den Braber, Arne Bjørn Mildal, Jone Nes, Ketil Stølen, and Fredrik Vraalsen. describes the process and results of a model based risk analysis carried out on a web application for customers of a mobile phone company. UML inspired diagrams and models were used for both specification of the input to the analysis as well as to express the results. The main diagrams and models used are explained.

Infosys Technologies Ltd. implemented a customer relationship management (CRM) system called CIMBA — Customer Information Management By All. “Infosys Technologies Limited: Unleashing CIMBA” by Debabroto Chatterjee and Rick Watson provides insights into the factors that triggered the need for developing such an integrated CRM solution and how the company went about developing and launching this system. It also brings to light the various challenges associated with the implementation of a CRM system.

In the next case, “Development of KABISA: A Computer-Based Training Program for Clinical Diagnosis in Developing Countries” by Jef Van den Ende, Stefano Laganà, Koenraad Blot, Zeno Bisoffi, Erwin Van de Enden, Louis Vermeulen, and Luc Kestens, the built-in tutor follows the student’s input with complex logical algorithms and mathematical computations, gives comments and support, and accepts the final diagnosis if sufficient evidence has been built up. Several problems arose with the development. In the first place, the evolution in the teaching of clinical logic is always ahead of the program, so regular updating of the computer logic is necessary. Secondly, the choice of MS Access as computer language has provoked problems of stability, especially the installation of an MS Access runtime. Thirdly, and most importantly, scholars want proof of the added value of computer programs over classical teaching. Moreover, the concept of a pedagogical “game” is often regarded as childish. Finally, the planning

and financing of an “open-ended” pedagogical project is questioned by deciders, as is the case with all operational research.

In “Cross-Cultural Implementation of Information System” by Wai K. Law and Karri Perez an international service conglomerate recently developed a strategic information system to enhance its service delivery and strategic adaptation. A routine implementation of an information subsystem at a newly acquired subsidiary ended with shocking failure. Cultural ignorance doomed the information system project delivered by a seasoned system development team.

PowerIT, an engineering company of about 200 staff, adopted an enterprise resource planning (ERP) system. After eighteen months the performance of the system was under scrutiny. The resultant investigation identified problems with the acquisition and implementation process. “Change Management of People & Technology in an ERP Implementation” by Helen M. Edwards and Lynne P. Humphries highlights the difficulties encountered in tailoring the enterprise resource planning system to the existing business practices.

Every situation involving information technology varies greatly from the next, providing IT managers and students alike with a wide expanse of successful IT implementation or IT catastrophe examples. It is our hope that the cases included in this volume of the *Annals of Cases on Information Technology, Volume VII*, will assist IT researchers, professionals, policy makers, teachers, and students in their own IT adoption situations and studies. Your feedback and comments, as always, will be greatly appreciated.

Mehdi Khosrow-Pour, D.B.A.

Editor-in-Chief

Cases on Information Technology, Lessons Learned, Volume 7

Chapter I

An Experiential Case Study in IT Project Management Planning: The Petroleum Engineering Economics Evaluation Software Imperative

Charles K. Davis, University of St. Thomas, USA

EXECUTIVE SUMMARY

The case covers key issues in information technology project management. It deals with developing a full set of project plans, including milestones, tasks, schedules, staffing, deliverables, and projected costs, for a complex software development project (Gido & Clements, 2003; Kerzner, 2003; Schwalbe, 2002). The essence of this case is the analyzing of a specific organizational setting with critical software needs and the developing of the needed plans. As in many similar situations, this organization is relatively complex, and the situation is not entirely clear. By reviewing the facts of the case, collecting outside information, conducting role playing interviews, analyzing requirements, and estimating schedules and costs, one can collect the information needed to develop baseline project plans for the software development envisioned in this case.

ORGANIZATIONAL BACKGROUND

This case is set in the oil and gas industry, in a family-held engineering consulting firm. This firm is a leader in its markets and wants to develop and extend its competitive advantage, and profitability, by developing sophisticated applications software for its engineers to use to leverage and extend their work product.

Petroleum engineers are professional engineers who evaluate the potential yields of oil and gas properties around the world. Petroleum engineering is essentially a branch of chemical engineering in which the principles of chemistry, chemical engineering, and geology are applied to the study and understanding of discovered petroleum deposits in the ground. Because the petroleum products reside in pockets or strata in the underground rock formations called *reservoirs*, petroleum engineers are also often referred to as reservoir engineers.

This analysis of petroleum deposits under the ground, generally referred to as oil and gas reserves, is extremely important to the companies in the oil and gas industry. Obviously, in the petroleum business, companies view their level of reserves as a critical asset. The process of extracting the petroleum from the ground once it has been found is called *producing*. The value of an oil or gas field is determined by the volume of oil and gas it will produce. It is, therefore, of the utmost importance to be able to estimate with a high degree of accuracy both the rate of production over time and that point in the future when a given producing property will stop producing.

The value of an oil or gas field is a function of two factors, how much oil and gas the field will produce and prices, the price per barrel of crude oil and the price per million cubic feet of natural gas, over the life of the field. One way an oil or natural gas company can assess its economic health is by analyzing its producing properties, estimating the amount of producible reserves it has in the ground, and forecasting the selling price of these reserves in the future when they are expected to be produced. By doing this, companies can project the dollar value of their petroleum reserves, a crucial indicator of their ongoing business viability. This process is called a *reserves economics evaluation*.

The value of a firm's petroleum reserves affects everything from its stock price to its ability to borrow money from banks to fund the unending search for new oil fields. Clearly, the companies have a vested interest in convincing the world outside that they are holding large reserves of high value. So the pronouncements by the oil and gas companies about their levels of reserves are generally viewed skeptically by the banks and financial markets without the *opinion* of an objective, highly credible, outside agent that can attest to the value of the reserves on hand for a given company. This is a case about a company that provides as a service just these kinds of assessments of the economic value of petroleum reserves and its need to develop a sophisticated software system to support and enhance its work. This case focuses on the project costing, work-breakdown scheduling, and manpower loading needed for this software system.

Hopkins & Associates is a consulting engineering firm. It consists of oil and gas reservoir engineers who provide independent evaluations of the reserves for oil and gas properties. Like a major accounting firm auditing the books of a client on the NY Stock Exchange, Hopkins "audits" the oil and gas reserves for a given company and issues an opinion as to their value. For example, if an oilman who is short on cash wants to borrow money to drill new wells, a bank might come to Hopkins to assess the oilman's properties to determine if he would be able to pay back the loans if he did not strike oil with the new

wells. Or, if one company wanted to sell an oil field to another, then both would need a firm like Hopkins to determine a fair price for the property.

With offices in Houston, Denver, Calgary, and Tulsa, Hopkins & Associates is actually a small firm of less than 1,000 people, about half engineers, but this is the norm for oil and gas consulting firms of this type. In fact, Hopkins is at this time the largest petroleum consulting company in the world and is very highly regarded for its integrity and the quality of its engineering work. The firm was founded by old Mr. Hopkins in the 1930s. As a young man with a newly minted engineering degree from the University of Tulsa, he participated in the founding of “petroleum engineering” as a professional discipline. In fact, some say he invented the idea of using engineering as a tool for understanding petroleum reservoirs. A man of great integrity and honesty, he was for several decades a central figure in the oil industry in Oklahoma, Texas, Venezuela, and the Middle East. In addition to the consulting arm of his company, he also owned several producing oil fields and a small, but highly profitable gas pipeline. He also owned a drilling company that did exploration, wildcatting mostly in Texas.

SETTING THE STAGE

Old Mr. Hopkins died recently. His only son now runs the firm. The younger Mr. Hopkins (“Hoppy” to his golfing buddies and “Hop” to everyone else) is a competent reservoir engineer with tremendous resources at his disposal, but even his closest admirers say privately that “He is not the man his father was”. Born and raised rich, he is the archetypical Texas oil man (think of JR Ewing in the old *Dallas* TV show, but much nicer). His mansion in the exclusive Preston Oaks area in Houston, a private Lear Jet always standing by, the biggest yacht in the Texas City Yacht Club, a fleet of private cars, a huge Mercedes limo, and all the rest; in many ways, he is bigger than life. But he lives under the shadow of his father’s legacy. At company retreats, Hop can be heard saying things like, “I could never hope to achieve my father’s stature in the oil business”. Kind, generous, and paternalistic to his employees, nevertheless everyone views Hop as a wild playboy type whose wife and kids are often neglected as he pursues his various interests around the world.

Of the four Hopkins & Associates offices, the Houston office is headquarters because Hop lives in Houston. It is housed in the Hopkins Building in Greenbrier Plaza. The firm’s largest office is in Tulsa, located in the Hopkins Plaza downtown, an office complex named after “the old man”. The Denver and Calgary offices are tiny by comparison to the others, but they generate a lot of business for the firm.

The company consists of four divisions, all of which report to Larry Jordan, a highly respected petroleum engineer who was the older Mr. Hopkins’ most trusted engineer and friend for many years before his death. He is revered within the firm and provides a sense of continuity and stability for both employees and clients now that the younger Mr. Hopkins has taken over the firm. Two of the divisions are actually incorporated as wholly owned subsidiaries of Hopkins & Associates, the pipeline company and the computer services company. Hopkins & Associates is in turn a wholly owned subsidiary of The Hopkins Companies, which is Hop’s holding company for the entire enterprise.

Jack Crocket and Em Stinson are key players in this firm. They supervise the reservoir engineering and economics evaluation jobs for Tommy Smith’s area. Each

supervisor manages the daily activities of a couple dozen engineers. Jack is one of the “old timers” who sees computers as a necessary evil and longs for the good old days when the slide rule was king. Still, he is adaptable and a very capable manager based out of the Tulsa office. Em was a college roommate of Hop at the University of Oklahoma. Em loves to tell the story, “When me and Hop were sophomores, we got drunk and somehow Hop drove his Cadillac convertible into the middle of the OU football stadium smashing things as he went. It was 3:00 AM on a cool, starry night in October. We lounged in the back seat drinking Wild Turkey out of the bottle until it was gone while talking about living an exciting life prospecting for oil. Then we staggered back to our dorm arm-in-arm and went to sleep. Unfortunately, Hop left his car in the middle of the stadium! We were expelled by the end of the next week!” (Upsetting the football establishment at OU is unwise. A former president of OU was once quoted as saying, “We try to maintain a university here that our football team can be proud of!”) That is how Hoppy became a proud graduate of the University of Texas. “Hook’em horns!”

CASE DESCRIPTION

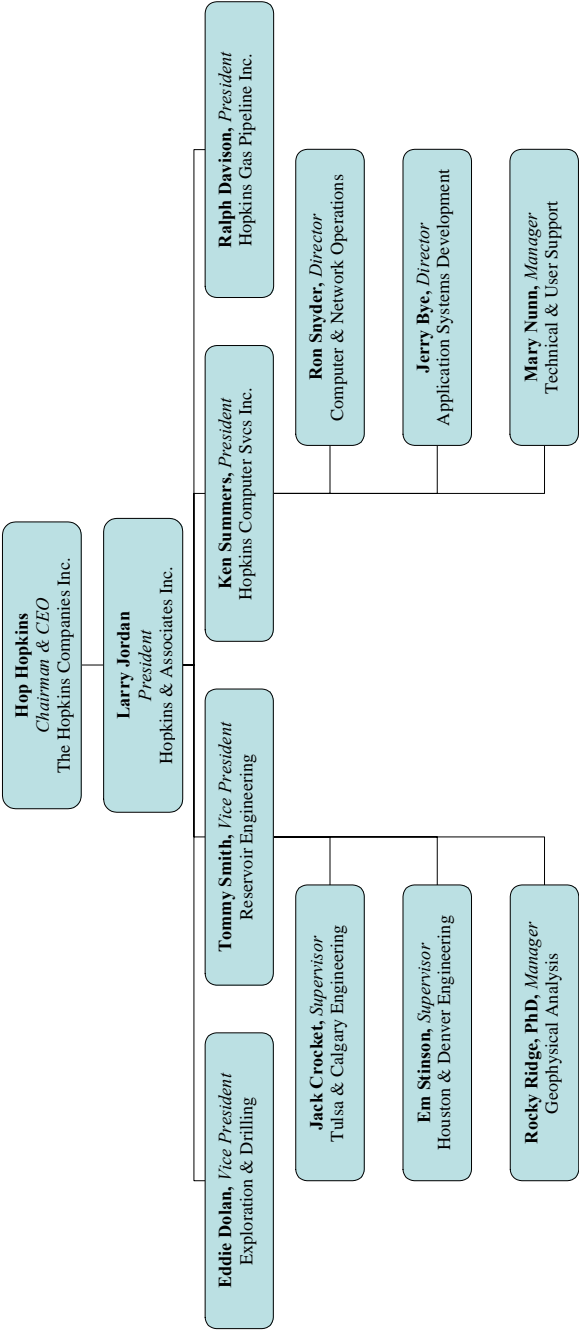
The rapid analysis and use of information is a key innovation (Eppinger, 2001). Therefore, the engineers at Hopkins use a lot of engineering and geology software tools to model and analyze the characteristics of oil and gas reservoirs. They also use financial analysis software tools to forecast the economics for each individual oil or gas well being evaluated using discounted cash flow analysis. Because of the importance of computers in the core work of the firm, the Board of Directors established a separate company, a wholly owned subsidiary of the engineering company called Hopkins Computer Services, Inc. (or HCSI for short), to better provide the computer services needed by the firm. The computer company operates a large distributed network with a modern computer center in Houston and numerous interconnected engineering workstations at the various Hopkins offices. HCSI employs nearly a hundred people (analysts, programmers, computer operators, network specialists, managers, and support staff).

The President of HCSI is a brilliant young petroleum engineer from Louisiana named Ken Summers. Ken was an All American golfer at LSU, which is a good skill to have in the golf crazy Hopkins companies. He has Hop’s trust and complete support. Ken is a good manager and an oil man through and through, but he knows little about computers or software development. Nevertheless, he has a vision. He wants to automate the entire process of generating reservoir economics for an oil field. He calls it the Petroleum Reserves Economics System, or PREsys.

Let’s look at what this might mean. Essentially, Ken is talking about building several generalized computer models and linking them together into a monster integrated decision support system for petroleum engineers (Arsanjani, 2002). Ken recently met with Hop, Larry, and the rest of the Board and summarized his ideas:

“Y’all, I think we need to link together three fancy computer models into one overall model to do this. Some of you know most of these ideas; some of you know some of them; and some of you are less familiar with the economics evaluation process. So, I’ll review the steps involved in doing an evaluation in terms of these three sets of activities.

Figure 1: An Abbreviated Organization Chart for “The Hopkins Companies, Inc.”



The **FIRST MODEL** would be that for an individual reservoir under an oil field. This model would include information about the dimensions of the reservoir (from seismic data and the like). The idea is to develop a three-dimensional map of the reservoir, its geology and its chemistry. The model would include information about the porosity of the rock making up the reservoir and the type of capstone rock that overlays it. We also need to know how many wells have been punched through the capstone into the reservoir. Also, important would be information about the chemical composition of the oil in the reservoir and the viscosity of that oil as well as temperature and pressure readings associated with the wells. Other parameters would include information such as the presence of other fluids in the reservoir (such as salt water) and the amount of pressure exerted by any pumping at the wellheads.

By using the Monte Carlo simulation technique for mathematical modeling and some sophisticated reservoir engineering analysis with these kinds of parameters, a model can be constructed to mimic the behavior of the well as oil & gas migrate through the reservoir to the perforations in the well casing and up to the surface. This kind of simulation should be able to predict the flow of petroleum products from the reservoir over time and it should be able to tell us when the well will cease to produce. Production at the wellhead is generally tracked and reported on a monthly basis and the simulation would generate monthly production estimates. This is the first model and it is the only part of this that actually requires complex engineering and geology.

The **SECOND MODEL** deals with forecasting economics for each individual well. By using discounted cash flow analysis, it is possible to estimate how much money a producing well will generate for its owners over the lifetime of that well. This analysis is generally done quarterly. The idea is to construct a spreadsheet to net the negative cash flows from the positive ones quarter by quarter over the life of an oil or gas well until its reserves are fully depleted. [The oil industry gets a special tax break based upon the fact that petroleum reserves are depleted over time. It is called the 'oil & gas depletion allowance' and is a minimum of 15% of gross income from production activities. The rationale for this tax break is that it helps the oil industry to drill for more oil, which is critical as existing wells are depleted over time. There has been some discussion of including a tax modeling component in PREsys, as well.] Generally, an oil company will lose money early when the costs of drilling are incurred and begin to make money later as the steady income of a producing well overcomes the earlier high expenses.

To begin analyzing cash flows for a specific well, we need two basic sets of numbers:

- The amount of crude oil and/or natural gas that the well will produce by quarter over its lifetime. Initially, this will be a high number gradually decreasing over time as the pressure in the well is dissipated in the reservoir below by the ongoing production. This is the set of estimates that come from the first model.
- The price of crude oil and/or natural gas that will be in effect from quarter to quarter as the oil is brought to market. The product of the amount of petroleum produced in a given quarter and the price at that time is the amount of money

the well will 'bring in' in that quarter. This revenue stream is obviously the most important positive cash flow in the analysis. But it depends upon reasonably predicting the price of oil & gas over the life of the well many years into the future. This is not at all a simple task but, of course, y'all know we do it all the time. It would be good if we could forecast prices better, though.

Once we have these numbers, we can populate a spreadsheet with these quarterly cash flows. This simple cash flow analysis is a good start but it is misleading because it does not take into account the 'time value of money,' meaning that one dollar received today is worth more to us than one dollar received in the future because a dollar in hand today can be invested at some interest rate. It will have earned interest and be worth more money by that time in the future when the second one dollar is received. We can also turn this idea around. How much is one dollar worth today if it is to be received in the future? For example, if you get \$.91 today and invest it at 10% per year, then in one year it will be worth \$1. In other words, 91 cents today is the same as \$1 a year from now in today's money.

Financial analysts reduce all of these ideas to the concepts of discounted cash flows and net present value. Once we have calculated the cash flows as described above, we determine the cost of money (the best annual interest rate we can get for our firm). That interest rate becomes what is called the discount rate. Then we convert that to an equivalent quarterly discount rate. Each discount rate for each time period in the future has a number associated with it called a discount factor. Tables of discount factors are readily available. You get the discount factors for your company's discount rate and multiply the cash flows in the spreadsheet quarter by quarter with the discount factors. The result is a figure for each quarter that represents the cash flow for that future quarter in today's dollars, just like the example above with the 91 cents. These are the discounted cash flows. If we add them all up, quarter by quarter, we get the total value of the reserves for a given well, again, in today's dollars. This is the net present value of the well and it is the number that the bankers and financial markets want to know.

*The **THIRD MODEL** deals with consolidating these numbers across an entire oil field. It is essentially an accounting-style 'roll-up' procedure. In order to understand the economic value of an entire field, it is necessary to identify all the reservoirs and wells that make up the field. Of course, there may be only one large reservoir or several smaller ones under a field, and there may be any number of wells tapping into whatever configuration of reservoirs underlies the field, as well. Understanding the reservoir configuration is essential for the engineering work, and understanding the monthly production by individual well is essential for the economic analysis. The roll-up procedure is the process of summing all the discounted cash flows for all the wells on a property by quarter and overall. The total of all the discounted cash flow totals for all the wells in the oil field is the economic value for the entire field in today's dollars."*

Everyone sat quietly, intently waiting while Ken made his case. As the Board looked on, it became obvious that Hop was convinced. "A sophisticated three-dimensional reservoir software package, one that could predict the flow of oil and gas at the wellhead

and forecast revenues and profits automatically by well or by oil field for his reservoir engineers! What could be better?!!” Larry offered a word of caution. He had read that big software projects are risky and too often fail (De Meyer, Loch, & Pich, 2002; Keil & Montealegre, 2000; Matta & Ashkenas, 2003). He noted that “the credibility of Hopkins & Associates in the marketplace could be eroded badly if the PREsys computer software was not absolutely accurate and reliable”. Ken agreed, saying that he believed that accurate and reliable software could be created; and, if it could, it would provide a great competitive advantage for the firm. Tommy Smith, who was also at the Board meeting for a presentation, was excited. “You know,” he said, “oil wells change hands all the time. And sometimes, a client will use the same wells as collateral several times. We have folks coming to us to re-evaluate the same wells that we evaluated just a few years ago. We can just dust off the old evaluations, update them and resell them. That is really the most profitable part of our business! If we could electronically file and organize completed evaluations, indexing and cataloging them on the computer, we could make the process of updating and reselling old evaluations a lot easier to manage. It would also help us make sure that our evaluations of wells stayed consistent!” Hop was wide-eyed. He could see how this kind of system could really streamline the task of doing oil and gas reservoir economics analysis and increase his profit margins all across that part of the business. He ended the meeting on his way to give another interview to *The Oil Journal* by asking, “When can I have it and what will it cost?”

CURRENT CHALLENGES/PROBLEMS FACING THE ORGANIZATION

Ken was smiling as he left the meeting, but he soon began to “sober up” contemplating the scope of the task ahead. Now he needed a project plan, a manpower loading plan, and a budget plan for this project fairly soon. He thought about who on his staff might be able to do the necessary planning. There was Ron Snyder. Ron is a Texas A&M Aggie and a super computer technology guy. And he was the principle architect of the Hopkins computing infrastructure. The network consists of a T3 digital backbone between the Houston and Tulsa offices with similar T1 links between Houston and the Denver Office and Houston and the Calgary Office. Various hubs and LANs in the Hopkins offices provide the necessary connectivity so that every engineer has access to the databases and systems in the Houston datacenter from his or her desktop. All network protocols are either ETHERNET or TCP/IP compatible for local and wide area networking, respectively. A longtime user of DEC computers, the Houston datacenter now utilizes HP AlphaServers, a GS320 and two GS80s, all running under the OpenVMS™ operating system. The geophysical and drilling staffs were outfitted with UNIX-based scientific workstations and the engineers all use Windows-based platforms for their engineering workstations.

Ron is good with the technology but he does not know enough about petroleum engineering to do this job and, besides, he is too busy running and maintaining the firm’s other systems. Then there was Mary Nunn. Mary ran the user support function at the datacenter in Houston. An ace teacher and trainer, Mary was a former secretary for Jack Crocket, a super “gal Friday” with excellent people skills. Everyone liked Mary. She was

a natural leader and had picked up a lot about reservoir engineering in her 18 years with Hopkins, but not being an engineer herself (or even degreed), she would have a hard time maintaining credibility with the engineering staff during requirements analysis (Howard, 2001). She may not even understand what they are talking about with some of the key down-hole engineering simulation formulas and mathematics that would govern the migration of petroleum through a reservoir.

Another of Ken's trusted lieutenants is Jerry Bye, who runs the applications development and maintenance functions for the computer company. Jerry is a great guy from Indianapolis, a fanatic fan of NASCAR and the Indianapolis 500, which he attended every year growing up as a kid. He is well schooled and experienced in software development (Kezsborn & Edward, 2001; Marchewka, 2003), expert in procedures for project cost estimation (Armour, 2002), but he too is *not* an engineer. Therefore, Ken is even hesitant about Jerry. He is sure that the PREsys development project will be expensive and will consume a lot of engineering time around the firm. In a company owned and operated by engineers, Ken is hesitant to put a non-engineer in charge of such a high visibility project. Hop will probably let him do it, but if the project turned out badly, it would be a politically difficult decision to justify to the rest of the engineers in the firm. There would be a lot of second-guessing, and Ken finally decides he is just not interested in taking that risk.

Ken is also concerned that whoever he chooses to *plan* the project should be in a position to become Project Manager for the project once it is approved and funded by Hop and the Board. HCSI is a small company and all of his most capable people are critical (even indispensable) to the ongoing operations of the HCSI in their current roles. Ken reluctantly decides that no one on his current staff can take on this mission-critical project for Hopkins & Associates (Hayashi, 2004; Klein, Jiang, & Tesch, 2002).

Fortunately, Ken has an "ace in the hole". He has a friend from his days working for Shell Oil prior to his joining Hopkins. His friend, David M. Gardner, was educated as a petroleum engineer at SMU. He had been a crackerjack programmer at Shell for 10 years, where he learned to develop state-of-the-art software following generally accepted industry standards (Rada & Craparo, 2000). Gardner is now a computer consultant to the petroleum industry with his own firm, David M. Gardner & Associates, Inc., based out of Dallas. Ken calls David, who is on the next plane to Houston. David is shrewd. He agrees to develop the plan and serve as Project Manager for the PREsys project if and when it is approved by Hop and the Board. He agrees to do all of this for minimal pay provided that David M. Gardner & Associates shares equally in the rights to the PREsys system and with the stipulation that The Hopkins Companies and its subsidiaries would be barred from selling the PREsys software itself. Hopkins can utilize PREsys internally to support its reservoir engineering consulting business, but PREsys will be a software product of the tiny, struggling Gardner company. In addition, David requests a royalty of \$7 per case from Hopkins for every well evaluation done by Hopkins and Associates that makes use of PREsys.

Ken and Hop discuss this arrangement. Ken confides that he has great confidence in David even though his company is small and has few resources outside of David's programming expertise. Hop, who really wants the PREsys software, agrees to the deal. The Board rubberstamps the contract and provides the initial funding. David rents an

apartment in the same block as the Hopkins Building in Greenbrier Plaza and moves to Houston for the duration.

Ken and David meet at Ken's office to begin planning the project. "Where do we start?" Ken asks David, smiling coyly but also deadly serious. The current problems facing this organization are clear. Oil and gas consulting is a highly competitive business. If H&A were to become technically obsolete, it would certainly lose its competitive edge. PREsys is a strategic, potentially mission-critical system. Hop, Larry, Ken, and David all understand this reality. Senior management sees a fundamental threat to the business if this technology is not developed soon. For them, there is a competitive imperative driving the demand for this system. So, whether it is realistic or not, Hop and the rest of senior management are pushing hard to get this new system developed and online in record time.

However, software development is not really the strong suit of any of The Hopkins Companies. None of the executive management has engaged in such a project before, and the systems staff is inexperienced as well. It is questionable whether they have the collective expertise to oversee the development of PREsys. There is a lot riding on David's expertise, his judgment and ethics, and his very small company. There is potentially a lot of risk associated with this project configured like this.

The challenge is to develop a realistic project plan that will help mitigate the risk and give the developers a reasonable chance of developing a first-rate system that will meet the needs identified while standing up to the time pressures effectively. This is a classic problem, one that is common today, and one that will always be with the information systems management community. And the problem is this: How to balance the demand for rapid delivery of final products by executives with great organizational power against the critical need to make sure that everything is properly analyzed, designed, constructed, tested and implemented.

There are two kinds of serious risks here, each diametrically opposed to the other. The first risk is that the system is not developed in time and The Hopkins Companies loses competitive position in the oil & gas consulting business. The second risk is that the company will rush to market with the PREsys software too soon, thinking that it is excellent, only to find out too late that there are serious flaws in the software that lead to inaccurate reserves economics forecasts and, eventually, major law suits. Fundamentally, the project planning for the PREsys software must balance these two risks in the face of real technical complexity and overly optimistic executive time pressures.

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APPENDIX

Role Playing For Interviews

Divide the class into five teams of interviewers to gather information about requirements. *Each person in the class is either a role player or a lead interviewer for a team, and each person is on perhaps two interview teams.* The following five individuals will be interviewed by one of the five teams of analysts. This exercise is done in an effort to begin the process of developing a project plan for systems development effort in this case and to officially *kick off* the project:

1. Hop Hopkins, President of Hopkins & Associates
2. Rocky Ridge, Manager of Geophysical Analysis
3. Ken Summers, President of HCSI
4. Jerry Bye, Director of Applications Systems Development
5. Mary Nunn, Manager of Technical & User Support

Sample questions for each interview are listed next. Please be sure that you get the information presented next, at least, plus any other information that you feel is relevant as well.

Sample Interview Questions for Hop Hopkins

- Tell me a bit about Hopkins & Associates and how you see the company in its marketplace.

- What do you hope to get out of this project short term and long term?
- What do you think would be a reasonable timeframe for this effort?
- What do you think are the major risks with this project?

Sample Interview Questions for Rocky Ridge

- What is involved in reservoir engineering modeling?
- Do you have time to serve to help with the modeling?
- How long will it take to build a generalized reservoir software model?

Sample Interview Questions for Ken Summers

- What is your vision for the system?
- Why do you want to bring in someone from outside to lead the development work?
- How do you expect to forecast the price of oil and gas in the future?

Sample Interview Questions for Jerry Bye

- How do you see this system returning value to H&A?
- What kind of staffing for this project can H&A provide?
- What systems development tools do you support?
- What platforms do you think that this system should run on?

Sample Interview Questions for Mary Nunn

- How is your staff organized and where are they located?
- How would you assess the computing capabilities of the engineers?
- What additional requirements would you need to support this new system?

Now, the following are facts and information about the persons to be interviewed. Each role player is given the fact sheet that pertains to his/her character. The fact sheets help to establish how each player is to play each part and include attitudes and facts that are to come out in the interviews. Only the individual playing each part should be given the fact sheet for that part.

About: Hop Hopkins

Assorted Facts

H&A generated \$382 million in revenues last year. Hop's mother is descended from an original western Pennsylvania oil family and views H&A as important because it bears the Hopkins name, but really as "small potatoes". Hop is seldom at the office, which is huge with red silk-covered walls and Louis XIV furniture covered with gold-leaf, reminding one of certain houses of ill repute in New Orleans.

Primary Work Responsibilities

- Hop is the President & Chairman of the Board of the holding company that owns all of the Hopkins Companies. *"I want the Hopkins Companies to be there for our employees so that they can raise their families and be happy doing it."*

- These companies are privately owned by his family, mostly by his mother. *“Mom is a hard task-master. I am glad she lives in western Pennsylvania and we are not!”*
- Hop is a curious mixture of figurehead for the firm and final authority for all decision-making in this collection of companies. *“I like to let the companies operate for themselves. As long as they get their work done and make profits, I don’t like to get involved too much.”*
- Hop almost always defers to the presidents of the various Hopkins Companies, especially to Larry Jordan. *“Let’s see what Larry Jordan has to say about that before we make a final decision.”*

Public Persona & Attitudes Toward Work

- First and foremost, Hop is a flamboyant salesman with a big smile and a glad hand. Hop always introduces himself and shakes hands with the individuals that he encounters and projects his importance right away. *“Hi! I’m Hop Hopkins. Good to meet you! You know, I bought a Lear Jet the other day and it is really nifty, and super convenient!”*
- Hop is “old money” and very polished socially. *“I’ve always loved theater and really enjoy Broadway plays. I studied DANCE in high school and college and danced in a Jazz Dance Troup when I was a kid!”*
- He believes in self-promotion and that, by promoting himself, he is promoting H&A. *“I was in the Middle East last week and Venezuela the week before. One of those Saudi princes gave me his new Mercedes limo for only \$25,000. He was tired of it. The thing is bullet-proof! It should be here by the end of the week.”*
- He pays a great deal of attention to his appearance, having only the most exquisite personal grooming and elegantly tailored clothing, even for casual wear. *“Back when I dressed in business suits all the time, the TV stations never gave me a moments notice. Then I started wearing bright yellow golf slacks and flashy sport shirts and now I’m on Houston TV as an oil industry expert almost every week!”*
- Hop is not concerned with company problems much. He has Jordan to handle those. He is a cheerleader for the firm and works to be optimistic. *“We only hire the best people and we give them the best working environment and tools. Hopkins cares about its customers and its employees like family.”*

Personal Agendas

- All Hop really wants to do is play golf with a group of oil and entertainment industry tycoons. *“Every year we sponsor a tent at the Doug Sanders Pro-Am Golf Tournament in Houston and hang out with Doug, and Willie and Waylon, and the boys!”*
- Hop is insecure and believes he can never really live up to the legacy of his father. *“I stood there watching them zip him up the body bag after he died and wondered what am I going to do now?”*
- He is a hedonist who is always looking for a new girlfriend. *“Hey fellas, let’s go to the club. Or let’s send the Lear Jet over to Denver to get ‘the girls’ and bring them back here to the ranch.”*

- Hop has always had an interest in Rocky Ridge, but she has always wanted to keep work and pleasure separated. *“Boy that Rocky is one hell of a woman.”*

About: Rocky Ridge

Assorted Facts

Rocky's group is independent from the rest of the firm. There are no other geologists or geophysicists in the Hopkins Companies outside of her group. She does independent studies for clients as well as projects for various Hopkins subsidiaries. Last year she engaged in mapping and analyzing the subsurface structures in over 80 oil fields in Texas and Oklahoma. Her most famous (and ultimately the most successful) job was an evaluation of the oil-bearing formations beneath Lake Maracaibo in Venezuela two years ago. People are still talking about that one!

Primary Work Responsibilities

- Dr. Roxanne (Rocky) Ridge is a PhD in Geophysical Sciences from Oklahoma State with six years of experience in the petroleum industry, most of it at H&A. *“Sometimes, I really love this business. It is so exciting when a well comes in!”*
- Rocky runs a team of some 20 geophysicists, plus support personnel, that analyzes client seismic data to determine the most likely spots for successful drilling. *“We use tools like a ‘black oil simulator’ that helps us to understand how petroleum will flow to the borehole and up to the wellhead at the surface. That tells us the rate of flow and how long a well is likely to produce.”*
- Rocky is renowned for her ability to find oil or gas deposits that have been previously overlooked in older, supposedly depleted fields. *“This three dimensional modeling has made a huge difference in my ability to recognize reserves in old seismic data. Hop & Larry have equipped a state-of-the art geophysics lab for us here in Tulsa, complete with the latest computers and modeling software.”*

Public Persona & Attitudes Toward Work

- Rocky is aloof and has a superiority complex about her ability to use new technology to identify reservoirs and find petroleum deposits. *“This work involves a highly sophisticated understanding of geology and it is hard to explain in simple terms. We use complicated models to analyze geophysical data in three dimensions. I am afraid that it is too hard for you to understand, really. It takes years of training and experience to appreciate what we are doing here.”*
- Rocky is an attractive woman in a position of power right in the middle of the “old boys” network that runs the oil business in Texas and Oklahoma. Most of the time she is overly serious and too severe, but she is not above flirting occasionally to gain influence. *“Come on, Eddie [Dolan], you know we just have to drill in the Austin Chalk one more time. I showed you what we think is over there in the area around the Wayside-One well. Come on, Eddie!”*

Personal Agendas

- Rocky was fired from her previous job and does not want to explain anything about her work to anyone that she does not control personally. She avoids giving out any information unnecessarily under the pretext that it is all too hard to understand without a PhD or years of experience in the geophysical field. *“Like I told you before, this is just too complicated to explain without a lot of training in this field. Just let us take care of it. I’ll loan you one of my people to do the analytical work and you can do the programming part of it.”*
- Rocky knows that Hop is interested in her, and she is flattered by his interest. But she is happily married to a veterinarian who was raised in College Station and she keeps Hop at a distance. *“Hop is a great guy to work for. He has really supported our department with the latest gear and he has let us hire some really good people; and I really appreciated that.”*
- Rocky is in her early thirties. She would actually like to retire from the oil business, maybe teach college, and begin a family, but she is just making too much money. *“Sometimes, I think that if the pressure doesn’t let up, my husband, Bubba, and I will just drop out and go live on a beach somewhere and make babies for a few years!”*

About: Ken Summers

Assorted Facts

HCSI has a budget of \$11 million. The computer company as a separate unit makes huge profits, with profit margins regularly 65% or higher. But this is actually a “paper profit” because HCSI charges very high prices to H&A absorbing a lot of H&A’s profits. Larry believes this is a good way to deflect customer complaints that Hopkins charges too much for services. *“It’s those ‘gal darned’ computer costs!”*

Primary Work Responsibilities

- Ken is a young reservoir engineer, a protégé of Larry Jordan. Ken is a ‘super user’ type. *“I really do not know much about computers, or systems development, but Hop wants me to make sure that the HCSI and its products meet the needs of H&A’s engineering staff. And that is my role!”*
- Ken is in charge of the computer company’s daily operations and its systems development activities. In particular, he is intending to personally supervise the development of the new PREsys software development project. *“The future of reservoir engineering and economics depends upon having software that can automate projections and make the individual engineer more efficient. Getting this right is VERY important!”*
- Ken is responsible for hiring his friend, David Gardner, as a consultant to make sure that the PREsys project turns out all right. *“David is a petroleum engineer AND a programmer! He was in computer systems support for the reservoir engineering group at Shell Oil in Dallas, and he really understands what we need here.”*

Public Persona & Attitudes Toward Work

- Ken believes that he is the ‘man of the hour,’ a sort of medieval warrior battling to provide a critical software tool for his engineering colleagues to use in their work. *“A good manager can manage anything.”*
- Ken is a kind, friendly, hardworking, and capable young man. He is barely thirty and possesses tremendous energy and dedication to work. *“I was here late one Saturday afternoon last year. I was the only guy here and a FedEx delivery came. It was an envelope for Hop. I signed for it and left it on the corner of my desk overnight when I went home. Next morning, Hop showed me the contents of the envelope. It was a million dollar royalty check from one of his oil wells!”*
- Ken was an All American golfer in college and he loves to use his golfing skills to build friendships at work. Hop adores him for his golfing. *“Some weeks, I cannot get any work done because Hop keeps calling me to go golfing with him and some of our clients, or potential clients, and I have to go do it!”*

Personal Agendas

- In his heart, Ken only trusts engineers. He believes that other people, no matter how good, cannot measure up to the standards of the engineering profession. *“The Professional Engineer (PE) designation is something that only the very best can aspire to. Engineering professionalism means that engineers are the best people to work with.”*
- Ken wants to get out of the computer company as soon as possible and get back to the engineering work that he loves best. *“I know the people in this company and I know what they need from this software. So Hop and Larry trust me to get the computer company working smoothly. But I certainly will be glad when this job is finally done.”*
- More than anything, Ken wants to justify Larry’s trust in him. He gives ‘lip service’ to Hop, but he knows with certainty that Larry is THE man at Hopkins & Associates. *“I think that loyalty is the most important trait that an employee can possess. Larry is loyal to Hop and to the memory of Hop’s father. Without Larry, this company would have some serious difficulties.”*
- Ken really does not respect Hop. He thinks Hop is an overgrown adolescent. *“When we have the company Christmas & New Years parties, I like to stay close to my wife and kids. Then we go home before Hop starts getting wild.”*

About: Jerry Bye

Assorted Facts

Hopkins Computer Services, Inc., actually historically has done very little software development. Most of the software packages supported at HCSI are purchased from outside vendors or are applications developed and used independently by H&A engineers. HCSI is primarily a Data Center that runs and maintains ‘canned software’ packages to support the Hopkins businesses.

Jerry’s group is staffed for the software maintenance function. Every one of them wants to get out of routine maintenance and be on the development team for PREsys. Also, after the PREsys project is over, Jerry sees this new system as undoubtedly

elevating the stature of his group (and of him) in the opinions of senior K&A managers. He is very pleased by this prospect.

Primary Work Responsibilities

- Gerald Bye runs the systems development function in the computer company. He is a rather dull, methodical man in his fifties. *"I just want to do my job as well as I can and spend my evenings with my kids. I have two boys in their early teens. You know, little league and all that."*
- Jerry is experienced in the oil industry and he is well-grounded as a software development manager. He has both a solid technical education and extensive project experience. *"I am confident that we can develop this system in-house if Hop wants to, but I also understand that the reasoning behind getting a consultant with the engineering expertise to do the job."*

Public Persona & Attitudes Toward Work

- Jerry is a classic fire-fighter. He is poor at anticipating what might go wrong and planning for contingencies. He is very good at managing emergencies as they happen. He drives his employees crazy more often than not. *"Can you guys stay late tonight for a couple of hours? We had an outage on the simulator application today that affected the Tulsa office and we need to run some tests and do some outstanding maintenance. We need to have this problem fixed for Tulsa by tomorrow."*
- Jerry is convinced that he is underpaid. He has been reading ComputerWorld and has seen the latest salary statistics for the IT industry. His salary is \$9,000 below the numbers quoted there and he is unhappy about it. *"I wish Hop would do a study of the salaries here in the computer company and determine if we are keeping up with the market. If we fall too far behind, we will start to lose some of our technical people! And the best ones will be the first to go!"*

Personal Agendas

- Jerry is frustrated by the arrogance of the engineers, with the engineers subtly intimating that his performance would be better if he were an engineer. *"They don't think anyone can do a good job if he is not an engineer. It is a cultural thing; they just feel it in their bones. I just want to 'keep my head down' and ride this job until retirement."*
- Jerry complains that his staff is not being allowed to tackle the PREsys project on its own, but secretly, he is delighted to have some one else assume the risk of this project. *"I am looking forward to working with David and his programming team. We will certainly stand ready to give them any help that we can during this critical project."*
- Jerry discounts the idea that the profits of HCSI are a bookkeeping gimmick and he believes deeply that the staff at HCSI is not really given sufficient credit (or rewards) for the tremendous profit contribution that the computer company makes toward the Hopkins Companies bottom line. *"These engineers just don't understand how hard it is to keep all of these systems working. We make their lives a lot easier with our technology!"*

About: Mary Nunn

Assorted Facts

Mary's group handles about 35 calls per day during a typical workweek, with peaks usually happening on Mondays. The K&A engineers often work on weekends and problems accumulate over the weekends for Monday resolution. On Mondays, there are often fifty or sixty calls to be handled. Most calls deal with routine processing. For example, a request to expedite processing for a particular set of analyses or to find a set of historical cases and load them to the system are common. Some calls are reports of outages or processing errors that need further technical assistance and these must be referred to the proper support staff for resolution. New systems packages tend to cause a lot of commotion. But once the staffs in the engineering offices are trained, those kinds of questions are minimal.

Primary Work Responsibilities

- Mary is in charge of technical and user support for the computer company. Her group of about ten support staff operates a help desk, mostly answering 'how to' questions about software packages or logging system problems reported by users for later resolution by the programming staff. *"We are the first line of defense, so to speak. The new PREsys software will need to be supported by us and we are very interested in making it user friendly and intuitive for the engineers to use!"*
- As a divorced mother of two grown children, Mary is, in effect, married to Hopkins Computer Systems, Inc. *"Some days, I arrive here at the office at 5:00 AM and I go around to the desks of my staff and leave notes for them about ideas that I have had the night before. I think they find it stimulating to come in and find a note from me!"*
- The other function that is Mary's responsibility is training for users of the applications packages that reside on the Hopkins servers. *"I have a lot of expertise as a trainer. We are going to need PREsys training manuals, user guides, and presentation materials to use in rolling out this system for the engineers to use once the development is completed. We will have to work with the project team to assure that these items are available in a timely fashion."*

Public Persona & Attitudes Toward Work

- Mary is defensive about not having a college education. *"I worked for Jack Crocket in engineering at Hopkins in Tulsa for 18 years before coming to the computer company here in Houston. I was his number one assistant and I really learned a lot about working with engineers there! Sometimes good work experience is more valuable than a lot of impractical book-learning!"*
- Mary would often rather stay in her office than head home each evening. There is plenty of work to do and she thrives on getting things done. *"There are many of us who work late here. The freeways are crowded during the rush hour so it makes no sense really to leave until rush hour is over. We get a lot of work done after hours when the phones stop ringing! Of course, Hop provides an open bar*

for employees after 5:00 PM every day. So, everyone has a drink before heading home anyway.”

Personal Agendas

- Mary is secretly in love with Jack Crocket and was crushed when Hop brought in Tommy Smith to be VP for Reservoir Engineering instead of promoting Jack to the job. *“I think Jack Crocket is the best engineer in the company and the finest man I ever knew. If you need help with the specifications for PREsys, I suggest you talk to Jack. You cannot do any better than working with Jack on this. I can assure you!”*
- Mary hungers for recognition and reward for her dedication and hard work for the firm. *“I think we should do something special for the people who work the PREsys project to recognize their contributions as team members on this critical project.”*

EXPERIENTIAL TEACHING STRATEGIES

This is designed as an ‘experiential case’ (as opposed to an ‘expository’ one). It is for use in a graduate course dealing with Information Technology Project Management. This case fits in the course curriculum after the students have been exposed to project planning and cost estimating procedures as well as the importance of managing the expectations of project stakeholders and the complexities of project staffing. The main deliverable for this assignment is a project plan that fits the circumstances of the case, including the work-breakdown-schedule, work packages, task deliverables, staffing requirements, and cost estimates. This assignment can be done individually or in teams. At the completion of the case, it is often interesting to conduct a “structured walkthrough” of one of the project plans. Have one student (or team) project his or her project plans on a screen and present their ideas point by point, using this one case solution as a springboard and having the rest of the class discuss additions to or variations in the plan as appropriate.

This is not a case in petroleum engineering. It is a case that deals with planning information technology projects. The setting is the Oil & Gas Industry and the need to develop a software package to support petroleum engineers in valuing petroleum reserves. Software project developers often face situations in which they are to develop systems for users in areas that are foreign to them when the project begins. They learn the details of the user’s business and needs as the project develops. This case is crafted to provide enough understanding of the work and needs of petroleum engineers so that the resourceful student can develop a reasonable set of plans for this project, just as the resourceful project manager must do in the “real world” of software development.

This is an experiential case because it includes role playing as an integral part of the learning process. The concept is to have several students play key figures in the case during a series of interviews conducted by the other students who also role play as interviewers who gather new information and confirm old information gathered elsewhere (e.g., in the case discussions or from websites). At the discretion of the instructor, each student in the class should be on one or more interview teams. Those students playing key roles at the Hopkins Companies (Hop Hopkins, Rocky Ridge, Ken Summers,

Jerry Bye, and Mary Nunn) have a set of materials (including secret personal goals and agendas) that are not known to the rest of the class (the interviewers). These materials are intended to inform both their content responses and their behaviors during the interviewing. Obviously, the quality of this case experience depends in large part on who among the students in a class might be chosen to play these key roles. The instructor should choose carefully in assigning these roles, generally choosing the more outgoing and academically stronger students who can memorize and deliver the facts necessary and perform the acting roles needed. It is generally a lot of fun.

The interviewers are required to meet in teams and develop questions for the interviewees. Those who play one of the key roles for one interview generally join an interviewing team for one of the other roles. Interview teams elect a leader who is responsible for creating the interview agenda. Each member of the class must be sure to document the information that comes out of each interview carefully.

The role playing in this case involves five interviews, and therefore, fills a lot of classroom time. With students playing key roles, there is always the chance that an interview will fall flat or a student will miss class, or whatever. This could be a major problem, and the instructor will want to guard against potential problems. There is a way to do this. It should be noted that Larry Jordan is not among those included in the interviewing process, even though he should be. The basic story is that Larry Jordan (who is the real power behind Hop's throne) is out of town, in the Middle East working on a deal. On the night of Hop's interview, the instructor comes to class in cowboy (or cowgirl) clothes, at least a big hat, and plays the role of Larry Jordan who has returned unexpectedly from overseas travels and would like to sit in on the meeting. (If the instructor is female, then the full name is "Larry Ann Jordan" and "Daddy wanted a boy!") This ploy is a surprise to the class, loosens up the role players, and allows the instructor to inject new information into the interview and to control the first interview while the students figure out how it will work. Having established this expectation, the instructor can assume the identity of Larry Jordan at any time throughout the subsequent interviews if there are problems.