1-1-1994

The Vasa Capsizes

Richard O. Mason
Southern Methodist University

THE VASA CAPSIZES

Working Paper 94-0701*

by

Richard O. Mason

Richard O. Mason
Edwin L. Cox School of Business
Southern Methodist University
Dallas, Texas 75275

The *Vasa* Capsizes[1]

Managing Innovation

The challenge of managing projects involving large scale, innovative technology has a long history. One particularly illustrative case dates back well over 300 years to the reign of King Gustavus II Adolphus of Sweden and the building of the ***Vasa*** -- "The Tender Ship."[2]

10 August 1628

It was a beautiful summer day and hundreds of Stockholmers had come to the quay at Lodgården just below the Royal Castle to wish bon voyage to the ***Vasa*** on her maiden voyage. She was a "royal ship," the biggest, most powerful, expensive and richly ornamented vessel ever built for the Swedish navy, and likely any other navy, at the time. With 64 guns this massive warship was designed to engendered pride in the soul of the Swedish people and to strike fear in the hearts of her enemies.

And, she was decorated for power and glory. According to the prevailing belief of the time "Nothing can be more impressive, nor more likely to exalt the majesty of the King, than that his ships should have more magnificent ornamentation than has ever before been seen at sea." (Jean - Baptiste Colbert)

After vespers services on Sunday August 10, 1628 the ***Vasa*** was pulled out of harbor. For the first 200 yards or so she was tugged along shore by her anchors, still in the shelter of a small tier of cliffs to the south. A light wind was blowing from the southwest. As the big ship was pulled seaward, beyond

---

[1] This case was prepared by Professor Richard O. Mason of Southern Methodist University from public sources to be used for purposes of classroom discussion.
[2] So dubbed by Professor Arthur M. Squires in his book The Tender Ship: Governmental Management of Technological Change , Boston: Birhäuser; 1986.

the protection of the last cliff, Captain Söfring Hansson issued his order: "Set the foresail, foretop, maintop and mizzen." Obediently, the sailors scurried up the great ship's rig and hoisted four of her 10 sails. Just as they did, a slight squall arose from the south southwest, instantly catching the canvases, popping them open, thrusting the ship ahead.

Watching from the quay the well-wishers witnessed a spectacle that lives in history. According to the Council of the Realm's letter to the King, the ***Vasa*** ". . . . . immediately began to heel over hard to the lee side; she righted herself slightly again until she approached Bechholmen, where she heeled right over and water gushed in through the gun ports until she slowly went to the bottom under sail, pennants and all." In all, she had sailed only some 1400 yards. Now this glorious ship lay 110 feet below the surface of the water. Of the 125 crew, wives and children aboard for this festive occasion, at least fifty perished in the disaster.

It was more then just a personal disaster for the family and friends of the those who were lost and more than just another military disaster for the already weakened Swedish Navy. It was a major economic disaster. In the "King's Currency" the ***Vasa*** cost more than 200,000 Rex Dollars to build, a little over 5% of Sweden's GNP. One twentieth of the nation's annual economic product now lay at the bottom of the Stockholm harbor.

It was a unprecedented tragedy. One of the largest warships ever built had sunk to the bottom of the sea. In her own harbor! Under peaceful conditions! The Council of the Realm raised questions immediately: Why did it happen? Who was to blame?

<u>The Situation</u>

The 1620's were a calamitous period for the Swedish Navy. Prior to the capsizing of the ***Vasa*** 12 of Sweden's largest vessels had been lost. In 1625 ten ships, while on patrol in the Bay of Riga, ran aground and were wrecked during an unexpectedly violent storm. This prompted the King, who was fighting in Poland at the time, to order the ***Vasa*** and other ships built and to request their prompt delivery. Two years later during a confrontation with

the Polish fleet the Swedish flagship *Tigern* was captured. The crew of her sister ship *Solen* then blew their own ship in order to avoid losing it to the enemy as well. As a result of these devastating loses the King sent even more fervent messages home demanding replacement ships.

About The King

King Gustavus II Adolphus, the "Lion of the North," his countrymen claimed, was born a natural leader. A spellbinding orator of considerable intellect and a ferocious fighter, he had assumed the throne upon the death of his father in October 1611. He was only 17; but, he had already distinguished himself in battle by leading a successful counter-attack against the Danes in the battle at Kalmar. The Danes eventually recaptured Kalmar but during that war the victorious Danish King, Christian IV, had gained enormous respect for the courageous young warrior.

In 1611 the Baltic Sea was the center of several vicious commercial rivalries. Sweden was pitted against two great foes: Denmark -- to reduce her navigation tolls, and Russia -- to open up her markets. Gustavus threatened both with war. He eventually reached a peace agreement with Christian IV in 1613 -- this marked the last time Denmark would successfully defend her previous domination of the Baltic. Next, he conducted a successful campaign against the new Russian Tsar, Michael Romanov, culminating in 1617. The King then turned his attention toward Europe.

The Thirty Years war broke out in 1618; but, Gustavus hesitated to join at the outset. He was more interested in conquering Poland because he was intent on eliminating the threat to the Swedish sect of Lutheran Protestantism which was posed by his cousin -- and deadly personal enemy -- King Sigismund III. Sigismund, a Catholic, had been deposed from the Swedish throne in 1599; but, he was still making claims to be reinstated as King. He was, in Gustavus' eyes, the one "who allows himself to be governed by that Devil's party -- the Jesuits." Gustavus launched his first attack on the Polish stronghold in Livonia (modern day Latvia) in 1621. Within two months the great trading city of Riga -- the outlet for about one-third of Poland's exports -- had fallen to his forces. Five years later his armies routed the famous Polish

cavalry and secured the province of Wallhof. Gustavus now prepared for an assault on Poland's Prussian possessions to the south. In 1625, while still in Poland, the King ordered four ships to be built in the Stockholm shipyard: two large (one would become the ***Vasa***) and two smaller vessels.

History treats Gustavus II kindly. When he assumed the throne, Sweden was a small, impoverished country, humbled and at the mercy of the Danes. Twenty-one years later, when he was slain at the battle of Lützen in November 1632, Sweden had become the strongest force in northern and central Europe. His success was attributed to his personal magnetism, his demand for stern discipline -- people seldom crossed the king, and a creative military mind. His innovations included building a national standing army, deploying small and mobile units, developing strategies based on superior firearm power, and integrating land with naval warfare.

Gustavus' View of the Navy

Wars conducted in another land require supply lines and military protection. Between Sweden and the Continent lies the formidable Baltic Sea. A powerful fleet was therefore indispensable to the King and his army. "Second to God," the deeply religious Gustavus once proclaimed, "the welfare of the Kingdom depends on its Navy." A strong navy was necessary for accomplishing four crucial missions:

1. To protect Sweden against attacks from abroad.
2. To carry troops and material to theaters of war on the other side of the Baltic.
3. To provide revenue for Sweden by blocking Danzig and other ports in Poland, and by levying customs duties on the many cargo ships that used these ports.
4. To blockade hostile ports, preventing the enemy's fleet from leaving, on penalty of being conquered, bombarded of sunk.

A Chronicle of Events

THE VASA CAPSIZES

The key events leading up to the capsizing of the ***Vasa*** begin when a new naval shipyard was opened in Stockholm at least five years before the King's order.

1620

Antonius Moniter leased the Naval shipyard in Stockholm and employed the Dutch Master Shipwright Henrik Hybertson. Hybertson is an experienced shipbuilder of the highly respected "Dutch School" of shipbuilding. Eventually he will be responsible for the designing and building the ***Vasa***.

According to the methods used during this era most of the design requirements were kept in the head of the Master and executed according to his "School" of thought and his experience. No scientific theory of vessel design or stability was available. The shipwright made no mathematical calculations, for example, to determine such important factors as a ship's center of gravity, its center of displacement volume, its form stability or its weight stability. There were no schematics or engineering drawings. Instead, a ship's "reckoning" was used. It contained figures on the ship's main dimensions, its principal construction details, and other related facts. Everything else was up to the craftsmanship, professional skill and experience of the master shipbuilder.

1621

Monier and Hybertson contract to produce 3 ships during the next five years. Admiral Kaus Fleming is appointed by the King to oversee the contract. Pursuant to this contract the *Maria* is to be delivered in 1622, the *Gustavus* in 1624 and the *Mercurius* early in 1625. Since previously it took 2 to 3 years to complete a single ship, this contract called for a speeded-up overall rate of production.

1622

In February Monier and Hybertson contracted to build an additional ship the *Tre Kroner.* Similar to *Mercuris* it will have 30 or 32 guns and a 108

foot keel[3]. This means that the shipyard now has four ships under contract. (The *Tre Kroner* was launched in the Autumn of 1625 and delivered in to the Navy in 1626.)

1624

At the behest of the King, the Admiralty issues shipbuilding plans as follows:

1626: one large ship, with a 136 foot keel and 34 feet wide bottom,
1627: one smaller ship, probably with a 108 foot keel,
1628: one large ship also 136 feet long and 34 feet wide, and
1629: one smaller ship, also probably with a 108 foot keel.

1625

The pace of activity picks up during 1625.

On January 16 Henrik Hybertson and his brother Arendt de Groot , a businessman with good contacts with suppliers in both Sweden and Holland, signed a contract to build and deliver the four ships called for in the Admiralty's plans. The contract was not to become effective until January 1626 when Monier's original contract would expire. The *Tre Kroner.*, ordered in 1622, was still not completed; consequently, the contract obligated Hybertson to "complete and fulfill according to the wording and content of the previous contract whatever is still missing upon the ships and vessels lying at the shipyard." Thus, the *Tre Kroner* was to be completed before the ***Vasa*** was begun, the ***Vasa*** being a larger ship and the first of the new ships ordered.

The contract identified only the length and width of the ships. There were, as was the practice, no full written specifications or drawings. Thus, the master shipwright was responsible for determining the form and proportions

[3] The keel is the principal structural member of a ship, running lengthwise along the center line from bow to stern, to which the frames are attached.

of the ***Vasa's*** hull[4], calculating its main dimensions, and indicating how the ship would be manufactured. After the hull was launched, Hybertson's primary design and building responsibilities were completed [5]. He then became a manager overseeing the manufacture and mounting of the sculptures that adorned the ship. Not necessarily a trivial job -- this magnificent ship featured over 500 sculptures of lions, angels, devils, warriors, musicians, emperors and gods and more than 200 carved ornaments. It was designed to impress not only with her firepower, but also with her abundant sculptures. The shipwright was also responsible for fixing the gun carriages, checking out the rigging and preparing for future maintenance work. From this time forward, however, Hybertsson had little, if any, influence on the ship's naval architecture, equipment or its armaments.

The work load in the shipyard was increased considerably in mid-February when a contract was signed to complete work on the *Äpplet*, a ship originally begun in the early 1620's that required strengthening of its keel, stem, stern and related parts.

During the Spring, in accordance with his contract, Hybertson notified Admiral Klas Fleming, who was handling the business for the King, that he had ordered timber to be cut for one large 136 foot ship and two smaller 108 foot ships. (It is possible that the contract to finish the *Äpplet* resulted in the postponement of the second large ship.) The large ship referred to is likely the ***Vasa*** and its original keel, which was 136 feet long, was probably laid down at this time.

In September the Navy lost ten ships in the Bay of Riga. The King is with his army in Poland at the time. He immediately demands that the two smaller ships be delivered sooner than called for in the original contract.

---

4 The hull is the frame or body of a ship, exclusive of masts, sails, or superstructure.

5 A 1670 Swedish shipbuilding manual summarizes the Dutch method. First the keel was laid. Then the bottom planking was added, being held together by wooden chocks nailed on. Following this the floor timbers were laid and the ribs built up around them. The skin shell was added, strake by strake, until the hull was high enough to float. Then the hull was usually launched bow first and work continued while the ship floated in the water. English and French shipwrights used a different method.

October 3rd Admiral Fleming forwards Hybertson's specifications for the *Tre Kroner* to the King. They specify a keel with a length of 108 feet. Plans call for launching the ship by the end of the month.

Feeling the economic pressures of his war efforts, on November 3 the King writes to the Council of the State ordering the Council and the Nobility to contribute money for the construction of two new ships to be built in Hybertson's yard.

The next day the King answers Admiral Fleming's communiqué and requests that Hybertson be notified that he [the King] has made changes. The new specification now calls for building two smaller ships built rather than beginning construction on the larger one. Acknowledging receipt of the earlier specifications the King says that he has "somewhat altered it . . .desiring that you [Klas Fleming] with Master Henrik agree that he construct the 2 smaller ships according to our enclosed specification," and gives him a width in the bottom of 24 feet and a keel length of 120 feet, "about which nothing is mentioned in the specification sent here by you." This creates a difficult problem for Hybertson. He cannot build the 120 foot ship requested -- a size between the *Tre Kroner* (108 ft.) and the ***Vasa*** (136 ft.) -- with timber already cut for the ships under construction without, as he put it, "detriment to self."

On November 30 three sets of specifications are entered in the National Registry: First, the King's own specifications for the ships to be built. Second, Hybertson's specification for the ship which is timbered in the shipyard in Stockholm. (These two specifications do not agree on important dimensions concerning keel length and bottom width.) And, third, specification for a ship to be built by another shipbuilder.

1626

Hybertson officially notifies Admiral Fleming on January 2 that the timber he has cut does not match the King's new specifications. This applies to both the smaller and large ships. [6]

On February 22 the King replies to Hybertson's letter. He orders him to build the ships according to his [the King's] specifications, adding that if he is not willing to build two ships according to these specifications, he should instead build the 136 foot ship contracted for.

Hybertson reports on March 20 that a ship is under construction and that its keel length is 120 feet long.

Master Henrik is summoned to the Chancery on March 21 and is notified of the King's wishes. He promises to do whatever he can to satisfy the King's demands.

(Three hundred years later it is discovered that the ***Vasa*** 's keel was built using four keel timbers united by three scarf joints. [7] Beginning at the stern the first three keel timbers measure about 111 feet long. Including the fourth timber the keel reaches 136 feet in length.)

1627

In the Spring Master Shipwright Henrik Hybertson dies from an extended illness. His assistant, Hein Jacobsson, who has very little managerial experience, takes over with the aid of his young assistant Johan Isbrandsson. Henrik has been sick for about 2 years and communications have suffered as a result. Jacobsson has no detailed records or descriptions from which to work.

---

[6] Timber, of course, is a crucial resource for shipbuilding. For example, over one thousand oak trees were used in building the ***Vasa*** . In order to obtain the correct dimensions, the trees had to be located and specially felled for each part of every ship. Because the Navy's requirements were substantial, oak trees and other trees used in ship construction were protected by law.

[7] A scarf joint is a joint made by cutting or notching the ends of two pieces correspondingly and strapping or bolting them together.

Also in the Spring the plans for the ***Vasa's*** armament are filed with the Ordnance Master: 36 -- 24 pounders canon, 24 -- 12 pounders, 8 -- 48 pound mortars and 10 small guns for the fighting troops. The total weight is in excess of 70 tons. This is too much armament to be accommodated on one enclosed deck and one open deck. Consequently, the ***Vasa*** had to be altered to have two enclosed battery decks, making it very likely the first ship ever built in Sweden with two gun decks. (On her maiden voyage the ***Vasa*** had 64 guns on board. Her main firepower was forty-eight 24-pounders distributed evenly between the lower and upper gun decks[8].)

Late in 1627 the hull of the ***Vasa*** is launched. Work is now begun on fitting the ship out.

1628

In January the King visits the shipyard and inspects the ***Vasa***. He then returns to Europe to continue fighting.

Early in 1628 the armament plan filed the following spring is revised. Subsequently, the Shipyard Requirement List show another revision. This List was then revised two more times. The table below summarizes these changes.

---

[8] Records show that the final armament count was 24-pounders canon (48), 3-pounders canon (8), 1-pounders canon (2), 16-pound siege gun (1), 62-pound siege gun (2) and 35-pound siege gun (3) for a total of 64 guns.

Armament Type	1627 Plan	1628 Plan	Revised List 1	Revised List 2	Revised List 3	Actual when Capsized
Canon						
24-lbs[9]	36	30	60	54	58	48
12-lbs	24	30	-	12	8	-
6-lbs	-	8	-	-	-	-
3-lbs	-	-	-	-	-	8
1-lbs	-	-	-	-	-	2
Mortars						
48-lbs	8	4	4	4	6	6
24-lbs	-	2	2	-	-	-
Small Guns	10	?	?	?	?	Few

As the war heats up in Europe, the King orders that both the ***Vasa*** and another ship be ready for battle by July 25, 1628. ". . . . if not, those responsible would be subject to His Majesty's disgrace."

In late summer Admiral Klas Fleming conducted a stability test of the ***Vasa***. Neither of the two shipbuilders, Hein Jacobsson or Johan Isbrandsson, were present. For the test thirty men are required to run abreast from one side of the ship to the other. After the third crossing they were stopped. The ***Vasa*** was heaving and heeling so violently that there was a considerable risk that she would capsize. Boatswain Matsson,[10] who witnessed the test, told the Admiral that "the ship was narrow at the bottom and lacked enough belly." The Admiral's response was "the shipbuilder has built ships before." He should not be worried. Later, Matsson could only sigh with hope "God grant that the ship will stand upright on her keel." Following the test the Admiral took no

---

9 Each 24-pounder weighed about a ton and one-half and had a gun-crew of seven.

10 A boatswain is a warrant officer or petty officer who is in charge of a ship's rigging, anchors, cables, and deck crew.

further action. Even the shipbuilders were not notified. Fleming, however, reportedly uttered a wish: he hoped "that His Royal Majesty had been at home" to witness the test.

While the stability test was being conducted, the armament was still in the process of being produced and the artists were still working feverishly to compete the decorations. Consequently, it is unlikely that much, if any, of the armament or the decorations were on board at the time of the test.

On July 31 the King orders that the guns be taken aboard and that the marines be fully outfitted and moved into their quarters so that the ***Vasa*** can rendezvous with his fleet in the Baltic.

On August 10 the ***Vasa*** sank.

Inquires

The King was in Prussia on August 24 when news of the disaster reached him. "Imprudence and negligence" must have been the cause, he wrote back angrily to the Council of the Realm, demanding in no uncertain terms that the guilty parties be punished. Another inquiry, however, was already under way. Captain Söfring Hansson had been arrested and put in prison immediately after the disaster. The next day a preliminary hearing was begun. Based on the records that have been preserved, it appears to have gone something like the following:

"Had you failed to secure the guns properly?" Captain Hansson was asked on August 11. (The cannon had been fitted with wheels. Consequently, some thought that the windward guns might have rolled over to the lee[11] as the ship started to heel, shifting the ship's weight and contributing to her instability.).

"You can cut me in a thousand pieces if all the guns were not secured," he answered. (Three centuries later his claim was proven true.)

---

11 In nautical terms "the lee" is the side away from the direction from which the wind blows or the side sheltered from the wind.

"Were you intoxicated? Was your crew?"

"And before God Almighty I swear that no one on board was intoxicated." was the reply. (Also likely to be true since before boarding most had just come from religious services held that morning.)

"Was the ship stable?"

"Ballast was there as much as there was room for, and 100 lasts more than Admiral Fleming wanted, and the ship was [still] so tender that she could not carry her masts. . . . It was just a small gust of wind, a mere breeze, that overturned the ship," Captain Hansson continued. "The ship was too unsteady, although all the ballast was on board."[12]

Next, Boatswain Matsson gave his testimony describing Admiral Klas Fleming's stability test with 30 men.

Other questions were raised. Was the ship incompetently handled or maneuvered? Did she carry too large or too many sails? Was she overloaded? Was there something wrong in her design or construction?

No incriminating answers were forthcoming.

Attention was then turned to the surviving shipbuilders, Hein Jakobsson and Johan Isbrandsson, and their business partner Arent de Groot. The Judge asks Jacobsen "Why was the superstructure heavier than the lower part?" Several others had already testified that the ***Vasa*** was "heavier above than below."

---

12 Ballasting was done by "feeling" at the time, usually by simply filling the available space. Recent studies show, however, that there was not enough ballast aboard, ballast being a heavy material -- in this case stone -- that is placed in the hold of a ship to enhance its stability. Moreover, if more ballast had been added, as boatswain Matsson wanted but Admiral Fleming refused to allow, water would have come pouring in the gunports on the lower gundeck.

Jacobsen answered that he built the ***Vasa*** according to the "'instruction', which had been given to him by Master Henrik, and on His Majesty's orders." The ship conformed to all the measurements submitted to the King before the work began, he asserted, and His Majesty had approved these measurements. The number of guns on board was also as specified in the contract.

De Groot mentions that the ship was built in accordance with the Dutch prototype, also approved by the King.

"Whose fault is it, then?" the court asked.

"Only God knows," de Groot replied. And, with that the first inquiry was finished.

On September 5, a Naval Court of Inquiry, chaired by the King's half brother Admiral Karl Karlson Gyllenhielm, began in response to Gustavus' demand to find the guilty parties. The court was comprised of 17 persons, 6 of whom were members of the Council of the Realm and present at the previous inquiry. No conclusive result as to the cause of the disaster was reached by this second inquiry either. No one was ever found guilty. No one was punished.

The affair ended with no one knowing why it happened or who was to blame.

Fast Forward to 1961

"An old ship has been found off Beckholmen in the middle of Stockholm. It is probably the warship ***Vasa*** , which sank on her maiden voyage in 1628. For five years, a private person [Anders Franzén, a specialist on wrecked naval vessels] has been engaged in a search for the ship." This item, published in a Swedish newspaper over three hundred years later, announced again to the world the fate of the ***Vasa*** . It prompted a search once more for why it happened and who was to blame.

THE VASA CAPSIZES

(The raising of the ***Vasa*** from the harbor began on April 24, 1961. Due to the brackish water of the Baltic it was remarkably well preserved. It can be seen today at the ***Vasa*** Museum in Stockholm located not far from where it was originally built and were it capsized.)

The *Vasa* Capsizes

DISCUSSION QUESTIONS

1. What are the factors that caused the capsizing of the Vasa?

2. What contributing role did the various parties play? Who was responsible?

3. In what ways is the Vasa story like other large-scale systems failures you are familiar with? How have some organizations that have had large-scale systems successes avoided the pitfalls encountered in the building of the Vasa? How, for example, does the building of the Vasa differ from building of the Boeing 777?

4. What lessons can be learned from this case?

Note: The following is a partial list of papers that are currently available in the Edwin L. Cox School of Business Working Paper Series. When requesting a paper, please include the Working Paper number as well as the title and author(s), and enclose payment of $2.50 per copy made payable to SMU. A complete list is available upon request from:

Business Information Center
Edwin L. Cox School of Business
Southern Methodist University
Dallas, Texas 75275

90-0101 "Organizational Subcultures in a Soft Bureaucracy: Resistance Behind the Myth and Facade of an Official Culture," by John M. Jermier, John W. Slocum, Jr., Louis W. Fry, and Jeannie Gaines

90-0201 "Global Strategy and Reward Systems: The Key Roles of Management Development and Corporate Culture," by David Lei, John W. Slocum, Jr., and Robert W. Slater

90-0701 "Multiple Niche Competition - The Strategic Use of CIM Technology," by David Lei and Joel D. Goldhar

90-1001 "Global Strategic Alliances," by David Lei and John W. Slocum, Jr.

90-1002 "A Theoretical Model of Household Coupon Usage Behavior And Empirical Test," by Ambuj Jain and Arun K. Jain

90-1003 "Household's Coupon Usage Behavior: Influence of In-Store Search," by Arun K. Jain and Ambuj Jain

90-1201 "Organization Designs for Global Strategic Alliances," by John W. Slocum, Jr. and David Lei

91-0101 "Option-like Properties of Organizational Claims: Tracing the Process of Multinational Exploration," by Dileep Hurry

91-0701 "A Review of the Use and Effects of Comparative Advertising," by Thomas E. Barry

91-0901 "Global Expansion and the Acquisition Option: The Process of Japanese Takeover Strategy in the United States," by Dileep Hurry

91-0902 "Designing Global Strategic Alliances: Integration of Cultural and Economic Factors," by John W. Slocum, Jr. and David Lei

91-1001 "The Components of the Change in Reserve Value: New Evidence on SFAS No. 69," by Mimi L. Alciatore

91-1002 "Asset Returns, Volatility and the Output Side," by G. Sharathchandra

91-1201 "Pursuing Product Modifications and New Products: The Role of Organizational Control Mechanisms in Implementing Innovational Strategies in the Pharmaceutical Industry," by Laura B. Cardinal

92-0101 "Management Practices in Learning Organizations," by Michael McGill, John W. Slocum, Jr., and David Lei

92-0301 "The Determinants of LBO Activity: Free Cash Flow Vs. Financial Distress Costs," by Tim Opler

92-0302 "A Model of Supplier Responses to Just-In-Time Delivery Requirements," by John R. Grout and David P. Christy

92-0303 "An Inventory Model of Incentives for On-Time Delivery in Just-In-Time Purchasing Contracts," by John R. Grout and David P. Christy

92-0304 "The Effect of Early Resolution of Uncertainty on Asset Prices: A Dichotomy into Market and Non-Market Information," by G. Sharathchandra and Rex Thompson

92-0305 "Conditional Tests of a Signalling Hypothesis: The Case of Fixed Versus Adjustable Rate Debt," by Jose Guedes and Rex Thompson

92-0306 "Tax-Loss-Selling and Closed-End Stock Funds," by John W. Peavy III

92-0401 "Hostile Takeovers and Intangible Resources: An Empirical Investigation," by Tim C. Opler

92-0402 "Morality and Models," by Richard O. Mason

92-0501 "Global Outsourcing of Information Processing Services," by Uday M. Apte and Richard O. Mason

92-0502 "Improving Claims Operations: A Model-Based Approach," by Uday M. Apte, Richard A. Cavaliere, and G. G. Hegde

92-0503 "Corporate Restructuring and The Consolidation of U.S. Industry," by Julia Liebeskind, Timothy C. Opler, and Donald E. Hatfield

92-0601 "Catalog Forecasting System: A Graphics-Based Decision Support System," by David V. Evans and Uday M. Apte

92-0701 "Interest Rate Swaps: A Bargaining Game Solution," by Uday Apte and Prafulla G. Nabar

92-0702 "The Causes of Corporate Refocusing," by Julia Liebeskind and Tim C. Opler

92-0801 "Job Performance and Attitudes of Disengagement Stage Salespeople Who Are About to Retire," by William L. Cron, Ellen F. Jackofsky, and John W. Slocum, Jr.

92-0901 "Global Strategy, Alliances and Initiative," by David Lei and John W. Slocum, Jr.

92-0902 "What's Wrong with the Treadway Commission Report? Experimental Analyses of the Effects of Personal Values and Codes of Conduct on Fraudulent Financial Reporting," by Arthur P. Brief, Janet M. Dukerich, Paul R. Brown and Joan F. Brett

92-0903 "Testing Whether Predatory Commitments are Credible," by John R. Lott, Jr. and Tim C. Opler

92-0904 "Dow Corning and the Silicone Implant Controversy," by Zarina S. F. Lam and Dileep Hurry

92-0905 "The Strategic Value of Leverage: An Exploratory Study," by Jose C. Guedes and Tim C. Opler

92-1101 "Decision Model for Planning of Regional Industrial Programs," by Uday M. Apte

92-1102 "Understanding the Linkage between Strategic Planning and Firm Performance: A Synthesis of more than Two Decades of Research," by C. Chet Miller and Laura B. Cardinal

92-1201 "Global Disaggregation of Information-Intensive Services," by Uday M. Apte and Richard O. Mason

93-0101 "Cost and Cycle Time Reduction in Service Industry: A Field Study of Insurance Claims Operation," by Uday M. Apte and G. G. Hegde

93-0301 "A Robust, Exact Alborithm for the Maximal Set Covering Problem," by Brian T. Downs and Jeffrey D. Camm

93-0501 "The Economic Dependency of Work: Testing the Moderating Effects of Financial Requirements on the Relationship between Organizational Commitment and Work Attitudes and Behavior," by Joan F. Brett, William L. Cron, and John W. Slocum, Jr.

93-0502 "Unlearning the Organization," by Michael McGill and John W. Slocum, Jr.

93-0503 "The Determinants of Corporate Bank Borrowing," by Linda Hooks and Tim C. Opler

93-0504 "Corporate Diversification and Innovative Efficiency: An Empirical Study," by Laura B. Cardinal and Tim C. Opler

93-0505 "The Indirect Costs of Financial Distress," by Tim C. Opler and Sheridan Titman

93-0601 "A Mathematical Programming Method for Generating Alternative Managerial Performance Goals After Data Envelopment Analysis," by Jeffrey D. Camm and Brian T. Downs

93-0602 "Empirical Methods in Corporate Finance used to Conduct Event Studies," by Rex Thompson

93-0801 "A Simple Method to Adjust Exponential Smoothing Forecasts for Trend and Seasonality," by Marion G. Sobol and Jim Collins

93-0901 "Leveraged Buyouts in the Late Eighties: How Bad Were They?" by Jean Helwege and Tim C. Opler

93-0902 "Stock Market Returns and Real Activity: International Evidence," by Thomas C. Harris and Tim C. Opler

93-0914 "Quality Management at Kentucky Fried Chicken," by Uday M. Apte and Charles C. Reynolds

93-0915 "Global Disaggregation of Information-Intensive Services," by Uday M. Apte and Richard O. Mason

94-0101 "Financial Distress and Corporate Performance," by Tim C. Opler and Sheridan Titman

94-0102 "Models of Incentive Contracts for Just-in-Time Delivery," by John R. Grout

94-0103 "Economic Dependency on Work: A Moderator of the Relationship between Organizational Commitment and Performance," by Joan F. Brett, William L. Cron and John W. Slocum, Jr.

94-0201 "The Antecedents of Block Share Purchases," by Jennifer E. Bethel, Julia Porter Liebeskind, and Tim Opler

94-0202 "The New Learning Strategy: Anytime, Anything, Anywhere," by John W. Slocum, Jr., Michael McGill, and David T. Lei

94-0401 "Leading Learning," by Michael E. McGill and John W. Slocum, Jr.

94-0402 "Systems Analysis," by Richard O. Mason and Sue A. Conger

94-0403 "The Moderating Effects of Insupplier/Outsupplier Status on Organizational Buyer Attitudes," by Steven P. Brown

94-0404 "A Meta-analytic Study of Nomological Relationships Involving Work Performance and Job attitudes," by Steven P. Brown and Robert A. Peterson

94-0405 "Strategic Restructuring and Outsourcing: The Effect of Mergers and Acquisitions and LBOs on Building Firm Skills and Capabilities," by David Lei and Michael A. Hitt

94-0406 "Corporate Diversification, Strategic Planning and Performance in Large Multiproduct Firms," by David Lei, Noel Capon, John U. Farley, and James M. Hulbert

94-0407 "Determination of Swap Spreads: An Empirical Analysis," by Andrew H. Chen and Arthur K. Selender

94-0408 "An Analysis of PERCS," by Andrew H. Chen, John Kensinger, and Hansong Pu

94-0409 "Stock Price Reactions to the Passage of the Federal Deposit Insurance Corporation Improvement Act of 1991," by Andrew H. Chen, Marcia Millon Cornett, Sumon C. Mazumdar, and Hassan Tehranian

94-0601 "The Impact of Prior Firm Financial Performance on Subsequent Corporate Reputation," by Sue Annis Hammond and John W. Slocum, Jr.