CHAPTER ONE

The Story Begins

Most people are very familiar with the *Titanic* story from James Cameron's 1997 movie, or from documentaries on television. Typically, these focus on the last two days of the voyage and the last hours of the disaster itself. But what about the four-year construction project? Was it significant? What impact did it have on the disaster? What can we learn from that project that we can transfer to today's information technology projects?

Let's go back to 1909 and the business situation that faced White Star, the company that owned the fateful ship. (See Figure 1.1.) Their aging fleet of liners was grossly inadequate to compete with stiff growing competition. White Star embarked on a strategy to invest in new emerging technologies and create three super liners (two of which are

Figure 1.1: The infamous White Star Line logo.

shown in Figure 1.2). These were major investments as the liners were likely to be in service for at least 20 years. So for the designers it was critical to get the design right. They proceeded with a design strategy of luxury over speed where the ship's second class was equivalent to first class on other ships, and third class to second class.

To match the luxurious splendor (or the *functional requirements*) investments also had to also be made into *non-functional requirements* —everything that supports the functionals including performance, safety and capacity.

From the outset, no expenses were spared when investing in the latest emerging technologies for the non-functionals like the safety systems, which included a double skin hull (the bottom space divided into 73 watertight compartments), 15 bulkheads and electric doors, 48 lifeboats, and advanced water pump technology. However, as in many projects, a struggle took place within the project team where the success of the business strategy overrode other considerations.

One by one, compromises were subtley made in the non-functional requirements as the focus stayed on the functional requirements. Non-functional requirements were less visible, so this "corner cutting" went unnoticed. For example, the functional requirements for a spacious ball room resulted in four of the bulkheads not extending to the top deck, severely compromising the ability to self contain flooding. It was not only the business executives (principally Director Bruce Ismay) who were responsible for this but also the technical people—both the White Star architects and the Harland-Wolff ship builders.

By the end of the project construction stage, most of these safety features had been compromised. The height of the bulkheads was only 10 feet above the waterline in some places. The logical explanation for these compromises is that assumptions were made by the White Star architects that the "aggregated" safety features remaining would protect *Titanic* from whatever nature handed out.

By the end of project, the team believed that the safety levels were still maintained at the initial levels. So this set a high level of confidence for the maiden voyage (or

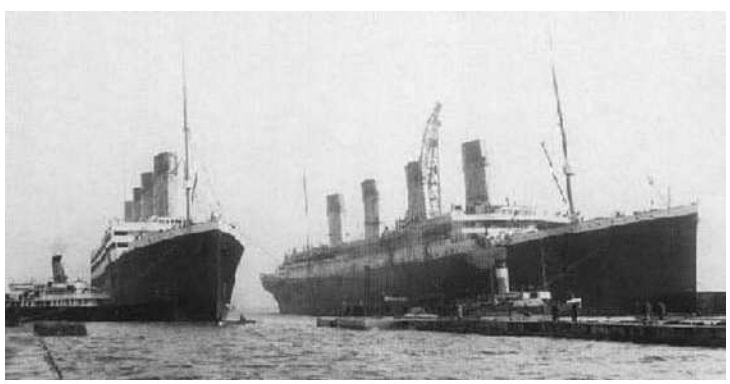

Figure 1.2: Sister ships Olympic *and* Titanic *in port.*

production). The arrogant view evolved that *Titanic* was a huge lifeboat. The *Titanic* project team made the mistake of believing the initial design assumptions, and not testing these far enough. Such was the confidence in the safety of the ship that by the end of the project, disaster recovery and business continuity plans were considered superfluous.

In short, the people "who should have got it"—the architects—allowed the compromises to pass. As the ship went into operation, a perception emerged that even if things did go wrong operationally the ship had enough safety features to protect it. This instilled a mindset in the crew and passengers that the ship was unsinkable. Why else were 53 millionaires aboard?

The ship set forth after a grossly inadequate "testing" phase, and enormous operational risks were taken. The ship's speed was steadily increased as it approached the ice field. Compromises were then made operationally as an ice detection test was fudged (see Chapter 7 for details), radio ice warnings were not passed to the bridge in a timely fashion, and a minimum number of lookouts were posted without binoculars. The ship's officers failed to piece together the extent of the ice field and understand the true danger as the feedback systems went awry.

Bring this story forward to today and there are many comparatives that can be made to modern IT projects, from construction right through to production. For example, there are many similarities with how IT project problems and issues surface days, months or even years after the project is completed and in production.

IT projects may be successful on deployment and pass a broad number of "standard" tests (system, performance and acceptance tests) yet still fail catastrophically when in operation. After all, only 25 percent of all IT projects are successful, a figure that has been continuously verified in various surveys.[1]

The success of IT projects should not be measured at deployment, but rather after the solution has been in production for a while and carefully measured. Metrics should be closely tied to the overall impact to the business. The *Titanic* story helps us better understand the relationship between functional and non-functional requirements, the interplay of compromises in the project and why things go horribly wrong in operation.

[1] Only 26 percent of all IT projects finish on-time, on-budget and with all the features and functions originally specified according to "Chaos, a recipe for success," Standish Group, 1994, 1996, 1998.

CHAPTER TWO

The Real Cost of IT Projects

Let us now go back to 1909 and re-examine White Star's business situation. How solid was the business case and did it cover the costs and risks adequately?

Today, before you commit to an IT project, you need to make a "go/no-go" decision on whether your "online operation" will be viable—i.e., the proposed IT solution has enough value to pay for and support itself and is not a "risk" to the business.

White Star's business case was very solid when viewed from a simple cost-benefit analysis. A staggering 75 percent of the total revenue was based on first-class passage. The three liners were viable within two years of operation. But was this enough, and did it cover the necessary risks and provide the adequate safety features needed?

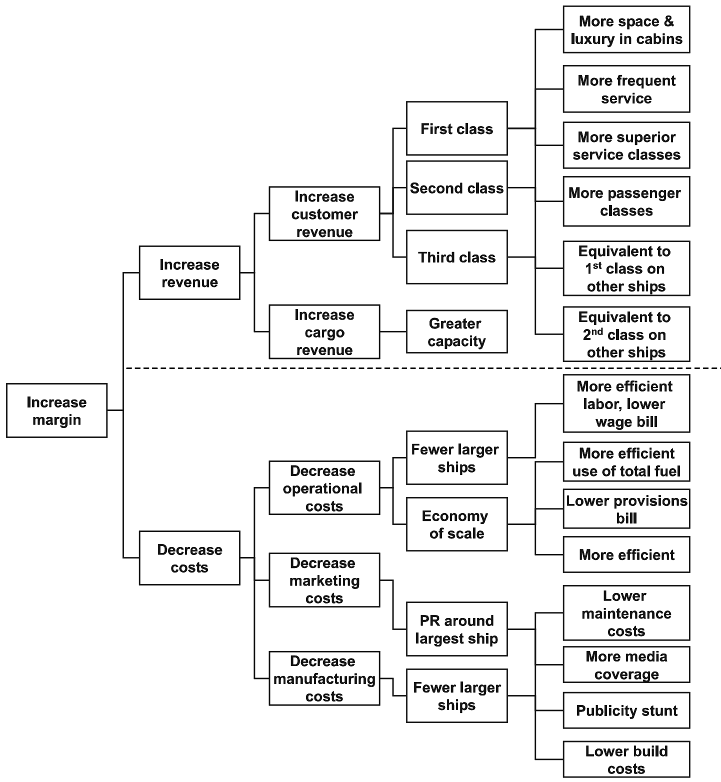

Figure 2.1: White Star's business case included items for both increasing revenues and decreasing costs.

Most IT projects go through a quick cost-benefit analysis to highlight their viability and draw on a three-year payback. A minority of IT projects go through a more detailed business case to forecast a return on investment and calculate the risks during the project and when the product of the project is in production (the online operation).

White Star, like any shipping company today, took out marine insurance that covered most eventualities in the event of a disaster. But what could the loss of a super liner mean to White Star? Could it put the company in jeopardy? Was there a “repercussive effect” that needed to be factored in?

Today, very few IT projects look beyond implementation. IT projects have always carried high levels of risk, but the Internet has further increased this risk because it not only alters customer behavior and expectations for service, but also dramatically increases the exposure of the organization. You must give this thorough attention and consider the possibility of the IT solution being unavailable.

This is a problem because with the Internet delivery channel there are substantial “repercussive effects” that need to be carefully considered and factored in. For example, customers tend to be less patient and forgiving with Internet Web applications and will make a rapid switch to a competitor.

For White Star, the repercussive effect could be the consequences of loss of service, or in the worst case—a potential disaster. In September 1911, *Olympic*’s Atlantic crossing was cancelled following a serious mid-Channel collision with *HMS Hawke*. This also stopped construction on *Titanic* as *Olympic* was being repaired. A worst-case scenario like a disaster, where White Star was found negligent for loss of life, could put it out of business through the resulting lawsuits alone.

In creating a comprehensive business case for your IT project, you need to look at least a year forward of the online operation, with a simple formula:

Revenue > (fixed costs + variable costs + solution investment)

In putting operations online, you are faced with the challenge of providing a 24/7 operation to your customers, partners, or suppliers. However, it won't always be 100 percent available. What kind of impact is this going to have, and how much unavailability can your organization tolerate? To get an accurate picture of ROI for your IT project, you need to factor in unavailability and its "real" cost into the above formula:

Revenue > (fixed costs + variable costs + solution investment + total unavailability costs)

But how do you measure the *total unavailability cost* and make it meaningful? Every minute your online operation is unavailable has an impact on your customers and organization. In that minute, you are not generating revenue or saving costs, and you can put a value against that minute.

To complete the calculation, you need to measure the number of times this happens for a period (e.g., a year) and the number of outage minutes assuming a 24-by-7 clock. A *User Outage Minute* (UOM) provides a meaningful measure and baseline to organizations. A UOM is based on the number of minutes one user is affected in an outage. So in the formula below, the UOMs are based on the total number of outages, the duration time of an outage and the number of users impacted.

> *Total unavailability costs = Unavailability cost * UOMs*

For each UOM, you need to calculate:

> *Unavailability cost = (average revenue per minute – absence effect value)*

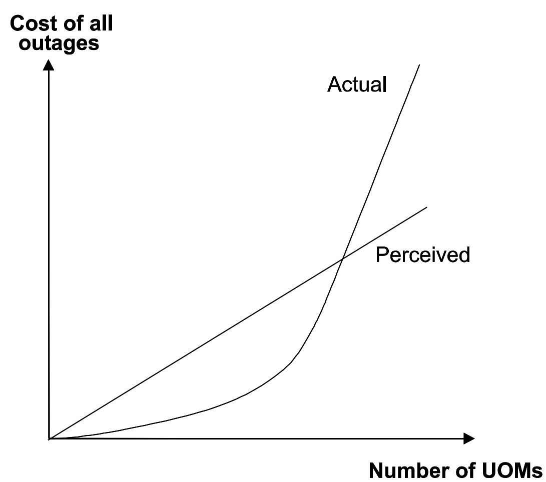

Figure 2.2: The cost of UOMs is actually much higher than most people expect.

However, with online operations, revenue is not evenly generated. More revenue is generated during peak periods. Knowing the revenue per minute for those peak period minutes is very significant because they are a lot more valuable. For example, with an online stock trading operation, the end-of-day trading period is the most valuable. The *absence effect value* is what it would cost your company if that minute of operation disappeared:

Absence effect value = (average revenue per peak minute + repercussion value)

The *repercussion valu*e is the ripple effect of the outage minute. For example, for revenue-generating online operations, this includes

- the impact of lost transactions,
- cost of adjustments and settlements,
- penalties paid for missing service-level guarantees,
- loss of customers and goodwill,
- loss of shareholder confidence,
- damage to image,
- brand-name erosion, and
- lawsuits and losses due to unfortunate timing such as outages during a peak sale period.

In the case of White Star, the repercussion value centered around penalties, loss of customers and goodwill, loss of confidence, damage to image, brand-name erosion and lawsuits.

Not all IT solutions have the same type of payback. A cost-reducing online operation includes the automation of paper handling, back-end functions or workflow processes. These have a different set of impacts, such as

- lost employee productivity,
- adjustments and settlements,
- additional support and maintenance expenses,
- penalties paid for missing service-level guarantees,
- loss of confidence in service, and
- losses due to unfortunate timing like outages during month-end processing.

White Star's business case payback period was relatively short, so the non-functional compromises were not likely driven by cost cutting. White Star failed to adequately assess the repercussive effect and incorporate it into the business case. Had it done so, the emphasis would have remained on investing in the non-functional requirements and eliminating risk as much as possible. After *Titanic*'s disaster, this lack of focus on non-functional requirements haunted White Star. The company was saved from bankruptcy only because the British government needed troop carrying ships when a world war loomed.