



Implementing Information Technology Successfully: Lessons for Taiwanese Companies

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ABSTRACT

The objective of this article is to discuss how Taiwanese companies can learn from the successes and failures of U.S. companies in implementing information technology (IT). This is an important issue because it is becoming increasingly clear that business organizations need to adopt IT if they are to obtain any meaningful and sustainable competitive advantage in today's hyper-competitive global economy (Applegate et al., 2003; Pearson, 2001; Wysocki and DeMichiell, 1997). Information technology has permeated every aspect of business, from procurement and supply chain management to enterprise resource planning and customer relationship management. And as business activity increasingly migrates to the Internet (e-business), the impact of IT promises to be even more pronounced. Taiwanese companies, which are faced with stiff competition in the Asian market (and the global market as a whole) are in a position to begin to implement IT in a significant way in order to enhance their global competitive position—indeed, it is becoming a necessity for them to do so. To this end, lessons from U.S. companies' experiences will be very valuable.

THE BENEFITS OF SUCCESSFUL INFORMATION TECHNOLOGY IMPLEMENTATION

There are many examples in the literature of how IT has increased the competitive advantage of U.S. companies. Early examples include American Airlines' SABRE reservation system (Hopper, 1990), which not only transformed passenger reservation in the airline industry, but also provided a huge competitive advantage to American Airlines. Similarly, American Hospital Supply Corporation (now Baxter Healthcare Corporation) developed the ASAP system, which radically altered the hospital-supply ordering and distribution system (McKenney and Copeland, 1995), giving the company a significant advantage over the competition. More recent success stories include the following:

- Dell Computers is well known for its speedy delivery of computers to its customers. Using highly integrated information systems, Dell is able to bypass retailers and ship its products directly to customers, usually within 48 hours. In other words, Dell has used IT to create a new delivery channel—in this case, by actually eliminating a link in the "traditional" distribution channel.
- Amazon.com has successfully utilized the Internet to alter the very structure of the book industry. Even though Amazon.com only realized its first operating profits in 2002, the company has acquired such a loyal customer base that it is expected to be successful in the long term. The fact that Amazon.com has started selling items other than books further strengthens that expectation. Amazon.com has effectively forced other businesses in its markets to adopt similar business models or face extinction.

One could argue that the preceding success stories may have been due to competent management or other company-specific factors, rather than their use of IT *per se*. However, a number of studies have found systematic evidence consistent with IT investments having a

positive impact on company performance (Teo et al., 2000). For example, in a three-year (1991-93), cross-sectional study of 85 organizations selected from Computerworld's "Premier 100" list, Mahmood and Mann (1993) found a positive correlation between IT investment and several strategic and economic measures, including revenue growth. Brynjolfsson (1996) reported that IT investments generate approximately three times their cost in value for consumers. Similar findings have been reported by Bharadwaj et al. (2000).

With the promise that IT holds for improving a company's competitive advantage, it is no surprise that many organizations are investing quite heavily in IT (Wen and Yen, 1998). According to Stratopoulos and Dehning (2000), IT investment, in both relative and absolute dollar terms, has been on an upward trend over the past 30 years. Bakos (1998) estimates that IT investment in the U.S. is as much as 30 percent of new capital investment. Estimates on annual investment in IT application development in the U.S. range from US\$250 billion (Standish Group, 1995) to US\$700 billion (Strassman, 1997). Thus, the overall picture that emerges is that companies which fail to invest in IT may face a steady decline in their ability to compete. With companies in the U.S. and other advanced economies increasingly adopting IT, Taiwanese companies would be well-advised to increase their understanding of how they too can employ IT in their operations. This is because Taiwanese companies increasingly need to respond to foreign competition both in their domestic markets and externally, as they increasingly seek a share of global markets. It is worth noting that the positive link between IT investment and firm performance found in the U.S. has also been observed, to some extent, in the Asian context. Studies by Wong (1994) and Ng (1995) have found positive correlations between IT investments and overall productivity in the Singapore economy (a direct competitor to Taiwan in many economic arenas and one that has many similarities to Taiwan, such as the scale of the economy and the typical size of companies). Their conclusions were based on measurements of such factors as return on assets and return on sales.

UNSUCCESSFUL INFORMATION TECHNOLOGY IMPLEMENTATIONS

While many organizational IT successes have been reported, it is equally important to recognize that there have also been many unsuccessful IT projects and initiatives among U.S. companies. Indeed, the Genesys Consulting Group (1999) reports that over 80 percent of IT projects fail to deliver their anticipated benefits. Thorp (1999) contends that a significant number of US companies' IT projects end up being late, over budget, or canceled altogether, with project failures costing an estimated US\$145 billion per year. Two examples of IT project implementation failures are the following:

- In 1997 Nabisco lost 2 percent of its market value as a direct result of poor integration between its two separate supply chains (one for Nabisco Biscuits and another for its Food Groups), which led to gross inefficiencies and, ultimately, to poor business performance (Kalakota and Robinson, 1999).

- In 1999, after spending US\$18 million on the project, the California state government had to abandon an information system intended to link welfare networks. Bates (1999) attributes this and other failures in the state government's IT projects to poor planning and implementation. She especially noted that the California state government spent the IT investment almost exclusively on the technology itself, without much thought to other important related issues like human factors—specifically as they relate to those who are expected to use the technology.

More generally, other empirical studies have reported a negative, rather than positive, relationship between the amount of IT investment and a company's financial performance—a relationship that is popularly referred to as the “productivity paradox” (Stratopoulos and Dehning, 2000). This paradox has also been observed among various Asian countries, including Taiwan (Tam, 1998). These findings suggest that all companies need to understand how to *effectively* implement IT so as to maximize their chances of success and the net benefits from the IT deployment. The need to do so is even higher for companies in an economy like that of Taiwan's for two main reasons. First, because of their generally smaller sizes and less plentiful resources, they are less able to afford costly mistakes. Second, with the entry of foreign companies into their domestic markets and their own entry into foreign markets, they can ill afford costly delays in catching up with their more sophisticated foreign competitors.

LESSONS FOR INFORMATION TECHNOLOGY IMPLEMENTATION

Seeking to understand the reasons for IT implementation failures, some practitioners have blamed the technology itself for some of the failures (Gardner (2000). While there is some truth to this, there are other reasons for IT project failures than the technology *per se*. Among these are: failure to use appropriate measures (Bharadwaj, 2000; Thorp, 1999); ineffective IT project management and implementation skills (News Report, 2001); lack of alignment of the IT project with the business strategy (Floyd and Woodridge, 1990); wrongly relying on technology to solve fundamental business problems; and lack of organizational readiness (Parker, 1996).

By considering the broad set of reports and analyses of U.S. companies' IT implementation experiences, a number of important lessons can be derived. These lessons can be useful guidelines for successful IT implementation.

Lesson 1: IT projects must be aligned with overall business strategy. For IT to have a significant impact on a firm's competitive position, it must be aligned with the overall corporate strategy, goals, and objectives. In contrasting well run organizations with those that are not very well run, Battles et al. (1996) state, “Well run organizations...integrate their IT strategy with their overall business strategy. The decisions their IT leaders make are based on real measures of business value, not politics or pet projects.”

Lesson 2: There should be a good working relationship between the CIO and the CEO. The alignment of IT projects with overall business strategy is greatly facilitated by a good working relationship between the CIO and the CEO. The importance of the CEO/CIO relationship has been emphasized in many places in the literature (for example, Pearson, 2001; Li and Ye, 1999; Parker, 1996; Wysocki & DeMichiell, 1997; Feld and Marmol, 1994). The CEO and CIO must have a good common understanding of the scope and objectives of any IT investment and/or project for it to flourish. Political battles or personality clashes between them can only lead to disaster.

Lesson 3: There is a need for good IT project management skills. The design, development, and implementation of many IT systems are usually very complex undertakings that need very careful guidance to a successful completion. Therefore, such projects need experienced and highly sophisticated IT project management skills (Sabherwal, 1999; Lederer and Sethi, 1996; Brancheau, Janz, and Wetherbe, 1996; Henderson and Sifonis, 1988). Several studies (e.g., Sabherwal, 1999) have been able to link IT project success directly to IT project planning and management skills. Of particular importance to IT project management is the

prioritization of the projects. Rajaji (2002) advises that IT projects must be prioritized based on their contribution to a firm's long-term goals, rather than its short-term goals. Another important component of IT project management is project scheduling. It is important that IT projects be completed within reasonable schedule limits (Oz, 1998; Wysocki and DeMichiell, 1997). This not only helps satisfy both internal and external clients, but also helps establish (or preserve) credibility for the IT department.

Lesson 4: The value of IT projects should be measurable. It is important for CIOs to be able to measure the value of their IT projects (i.e., their contribution to the company's profits). Patricia Benton, managing director of DCC Technology Management Group, a business unit of Dana Commercial Credit Corp of Ohio, remarks, “It's surprising how many large companies embark on an IT solution without any concept of its value to the organization” (Young, 1999). The ability to quantify an IT project's potential value—such as increased customer retention, market share, shorter sales cycle, lower inventory cost, or decreased time to market—greatly increases senior management support for the project, resulting in a higher probability of success for the project.

Lesson 5: Adopt an external orientation. Li and Ye (1999) assert that those organizations that are externally focused (i.e., on factors such as market expansion, product development, and customer retention) tend to show a stronger impact of IT on performance. An internal orientation implies a focus on internal efficiencies, which, though necessary for overall performance, usually do not result in sustainable competitive advantage because they are more easily copied or matched by competitors.

Lesson 6: Technology is only an enabler, not the end in itself. Technology *per se* will not give any organization a competitive advantage. Rather, the technology must be accompanied by transformational activities such as business process reengineering, organizational restructuring, and employee empowerment (Wysocki & DeMichiell, 1997; Bates, 1999; Parker, 1996; Venkatraman, 1994, Mahmood & Mann, 2000). This is because the types of information technology that provide strategic advantage almost invariably bring about a change in business processes. This change needs to be managed, which includes obtaining employee buy-in, focusing the technology on important aspects of operations, as well as the training and empowerment of employees to use the technology effectively. For example, Young (1999) cautions: “Making a process 20 percent faster is immaterial if the users don't think speed is relevant.” Basically, the company's culture should be ready to absorb and embrace the technology (Gardner, 2000).

Lesson 7: Relate technology to the specific circumstances of the company. Technology is context-specific, and will differ for each company. As Gardner (2000) observes, what is “best” for a Fortune 500 company may not be “best” for a small-to-medium sized enterprise. More generally, what may have been rated “best” in a research survey or by industry leaders may not necessarily be best for all companies. Each organization needs to assess its own unique situation and determine which IT solution is best suited to meet its goals.

Lesson 8: Measure ongoing success. Organizations need to continually monitor the success of IT projects even after project completion, to make sure that they are continuing to add value to the organization. This is referred to as post-implementation audit (Wysocki and DeMichiell, 1997). It not only validates the projects, but also helps focus attention—and hence priority—on those projects that return the highest value to the organization.

Lesson 9: Focus on flexible systems. In the current era of global economic turbulence, it is critical that IT systems be designed with flexibility in mind. It should be possible to change or adapt these systems to changing business conditions. Therefore, Taiwanese companies would be well advised to refrain from IT investments that lock them into rigid, proprietary technology platforms which make it difficult to adapt to changing market conditions. The Internet provides a non-proprietary, open system platform upon which organizations can base at least part of their IT infrastructure. It is not surprising that U.S. companies are investing heavily in Internet technologies. Surmacz (2001) asserts,

"Large and mid-sized U.S. businesses are expected to more than double their spending on Internet technology, from \$49 billion in 2000 to \$110 billion in 2004, with the bulk being spent on streamlining supply chains and managing partners through corporate portals." This observation provides a good sense of the general direction of global business. Taiwanese companies can take a cue from that.

Lesson 10. Training is important. Technology per se is meaningless unless it is accompanied by training of the IT professionals and the end-users who will be using it. A good portion of the IT literature has called attention to the importance of user training, and various studies have borne this out. For example, Sircar, Turnbow, and Bordoloi (2000) found a positive correlation between the amount spent on IT staff/user training and firm performance; this correlation was found to be even stronger than that between computer capital and firm performance. Thus, in seeking to invest in IT for competitive advantage, Taiwanese companies are also urged to keep the skills of their staff (both IT and non-IT) continually updated. That is the only way in which the technology can be utilized to its optimal potential.

SUMMARY

Information technology has become an integral part of business in today's global economic environment. Those organizations that are able to harness its capabilities effectively are the ones that will be able to compete successfully. Teo et al. (2000) predict that IT will increasingly become an integral part of business strategy in Asia. As Taiwanese companies face an increasingly competitive environment, both domestically and abroad, they cannot afford to be left behind. The lessons from U.S. companies' IT implementation experiences should be helpful in this regard.

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