

CASE STUDY

THE BIRTH AND GROWTH OF TOSHIBA'S LAPTOP AND NOTEBOOK COMPUTERS: A CASE STUDY IN JAPANESE CORPORATE VENTURING

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EXECUTIVE SUMMARY

This case study presents the "under the table" birth, accelerated growth, and ultimate success of two major technological and market innovations: (1) the Toshiba laptop computer, a project vetoed twice by corporate headquarters, and (2) the notebook computer, a project hidden from headquarters. Because of the vision, persistence, and championing efforts of a team of passionate Japanese corporate entrepreneurs, a new business was created that

is now part of Toshiba's mainstream operations and that has become a significant contributor to the growth and profitability of the corporation. We follow the evolution of this corporate venture from initial failures in 1978 to the success of the laptop computer, first in Europe (1985), then in the United States, and finally in Japan. This was followed by the reincorporation of the venture in the corporate "mainstream" (1987), the worldwide success of the notebook computer (1989), and the continued growth of the business in parallel with repeated promotions of the entrepreneurs.

First, a framework is presented for interpreting the case within current theories and practices of the management of innovation and the processes of championing innovative corporate ventures. This framework is expanded to include recent studies on how major corporations have achieved worldwide leadership in high-tech markets. Second, using the analogy of human life from conception to adulthood, the key phases, events, and entrepreneurial actions of Toshiba's PC business are summarized in Table

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1. Third, the theoretical framework is applied to a discussion of the unusual aspects of this case. Fourth, we analyze the business strategy and the technology strategy developed by Toshiba. Finally, we summarize the cultural and organizational context of Toshiba as well as other critical factors that contributed to the enduring success of this corporate venture.

There are four aspects, in addition to the international setting, that make this case interesting for both scholars and practitioners: (1) the "under the table" development of both the laptop and notebook, (2) the unexpected success of the first product, followed by a second success, (3) the evolution of championing at various organizational levels, and (4) the continuity of the strategic vision for Toshiba's information systems business from 1978 to the present, and how this vision was translated into specific business and technological strategies.

From the perspective of management of innovation, the successes of both the laptop and the notebook computers were due to the "back to the future" market research and design process summarized in Table 2. This process, where market requirements drive the design process, was developed by the lead entrepreneur, Tetsuya Mizoguchi, after repeated failures of the conventional process, where the results of R&D drive the design and product specifications, regardless of market requirements. From the perspective of the championing processes, we can observe both bottom-up and top-down roles (Day 1994): Mizoguchi was the product champion and Nishida the marketing champion in Europe, while General Manager Koga protected Mizoguchi from interference by headquarters; executive champion Mizushima orchestrated the difficult transition of the venture into a corporate mainstream operation. The evolution of the championing process is summarized in Table 3, using the Venkatamaran et al. model (1992). We conclude that the most appropriate model for interpreting this case is a combination of the Day and Venkatamaran et al. models, which emphasizes both multiple championing roles and the transfer of the lead role from one champion to another during the corporate entrepreneurship process.

The business strategy and market and technological strategies developed by Toshiba for achieving worldwide leadership in the portable PC market are summarized in Figures 1 and 2. More broadly, the process and critical factors that determined Toshiba's success can be visualized according to Figure 3. The corporate entrepreneurs and champions were driven away from mainframes by a vision of distributed and interconnected computing that compelled them to focus on personal computers. This focus determined the winning business strategy (fully compatible portable units) which in turn determined the technological and market strategies (miniaturization and complementarity to IBM). At the same time, this focus allowed the entrepreneurs to concentrate their scarce resources on the "back to the future" design process and develop unique core competencies. This coupling of winning strategies with unique core competencies made possible Toshiba's potential leadership in the marketplace. Actual leadership was achieved through continuous, step-by-step learning by doing and through market feedback that further reinforced the adopted strategies and enhanced the core competencies. Six critical factors contributed to the long-term success of the corporate venture: (1) the venture had the potential to achieve worldwide leadership in a mainstream area of the corporation, (2) the PC market in Europe and the United States (but not initially in Japan) was fragmented and highly receptive to unique innovations, (3) the corporate entrepreneurs were driven by a long-range vision of the business, with focused strategies and well-defined objectives, (4) the entrepreneurs were persistent and undeterred by repeated failures in the marketplace and by the distrust and hostility of headquarters, (5) the organizational context, because of slack internal controls, allowed the diversion of funds and manpower to the "under the table" venture and, finally (6) the role of entrepreneurs evolved from underground innovators to product, executive, and corporate champions in order to reinforce, broaden, and implement their vision.

INTRODUCTION

This case study of corporate venturing (Burgelman 1983c; Block and MacMillan 1993) presents the "under the table" birth and accelerated growth of two major technological and market innovations: (1) the Toshiba laptop computer, a project twice vetoed by corporate headquarters, and (2) the notebook computer, a project hidden from head-

quarters. In contrast to recent U.S. corporate venture failures such as Analog Devices (Kanter et al. 1990), Eastman Kodak (Kanter et al. 1991), NEES Energy (Kanter, Quinn, and North 1992), and to the closure of the Merlin-Gerin foundry (Badguerahanian and Abetti 1995), Toshiba was successful in reincorporating into the mainstream organization this new venture that has become a major source of revenue and profits with high growth potential (Koga 1995).

This article consists of five sections. First, we outline a framework that allows us to interpret the case within the present theories and practices of the management of innovation and of championing innovative corporate ventures. This framework also includes recent studies on how major corporations have achieved worldwide leadership in high-tech markets. Second, we summarize the phases, key events, and entrepreneurial actions of Toshiba's PC business: repeated failures from 1978 to 1984, unexpected (by corporate headquarters) success in 1985, reincorporation in 1987, and continued profitable growth at the present time (1996). This summary is based on information obtained in 1991 and 1993 during 20 in-depth interviews, in English and Japanese, with 11 engineers, managers, and executives who created and grew the venture. Third, the theoretical framework is applied to a discussion of the unusual aspects of this case. Fourth is an analysis of the business strategy and the technology strategy developed by Toshiba. Finally, we summarize the cultural and organizational context, as well as other critical factors that contributed to the success of this corporate venture.

FRAMEWORK

Four unusual aspects of this case in addition to its international setting, make it interesting for both scholars and practitioners: (1) the "under the table" development of both the laptop and notebook, (2) the unexpected success of the first product, followed by a second success, (3) the evolving process of championing at various organizational levels, and (4) the continuity of the strategic vision for Toshiba's information systems business from 1978 to the present, and how this vision was translated into specific business and technological strategies.

This corporate venture was based on two discontinuous technological innovations that established Toshiba as a leader in the worldwide market of portable computers. It can be examined from four different perspectives: (1) the management of innovation (Kanter 1983; Van de Ven, Angle, and Poole 1989), (2) the overall process of corporate venturing (Burgelman 1983a, 1983b, 1983c; Block and MacMillan 1993), (3) the specific process of championing innovative corporate ventures (Venkatamaran et al. 1992; Day 1994), and (4) the role of general and functional management for winning in high-tech markets (Morone 1993; Abetti 1994), as well as the technological and market strategies to achieve such leadership (Abetti 1997).

Merging these complementary perspectives, the following external (E) and internal (I) variables are useful for examining the evolution of the venture from its birth to the present.

- Market (E): In contrast to other cases where technology determined the targeted markets, this venture originated from an intensive field study of market requirements five years in the future and continued to be driven by market needs for portability and user friendliness.
- Technology (I): Market requirements and the imperative of maintaining a two-

year lead over the competition dictated which technology would be developed in-house and which would be acquired.

- Competition (E): The emergence of NEC as the leader in Japan determined the sequence of geographical expansions.
- Location (E): The venture originated and grew in the Ome factory, which is physically and psychologically remote from Tokyo headquarters (two hours by crowded suburban train or jammed roads). Only after reincorporation was the venture moved to Tokyo.
- Corporate Environment (I): Toshiba considered information systems as a core business, but the venture was regarded as a maverick. The attitude of headquarters was variously distrust, lukewarm support, disappointment, hostility, benign neglect, and finally enthusiastic acceptance.
- Mission and Strategy (I): The venture's mission was always, and still is, to be first in the market for portable IBM-compatible computers, but its strategy evolved according to changing market needs, technological progress, and the corporate environment.
- Role of Champions (I): This is the most important variable that determined the initial success of the venture, its accelerated growth, and finally the transition to core business.

KEY EVENTS

The history of Toshiba's Information Systems business (Abetti, Sumita, and Kimura 1995) is punctuated by several key events that determined the reactions and actions of its corporate entrepreneurs and champions. Using the analogy of human life from conception to adulthood, Table 1 presents the nine phases of Toshiba's PC business, the corresponding dates, the key events, and the entrepreneurial actions. The following is a summary of these phases.

Phase 1: Latency

Toshiba had struggled in vain since 1964 to penetrate the Japanese mainframe market, and finally decided to withdraw in 1978. RCA, Xerox, GE, and Matsushita—all unable to compete with IBM—had made similar decisions. For these companies, this was an irrevocable abandonment of the computer business that led to the dispersal of key personnel to unrelated product lines and the loss of core competencies. In contrast, Toshiba computer engineers, including Tetsuya Mizoguchi, the father of the laptop, and Masai-chi Koga, his future general manager, believed that the computer field was important to the company's future. This belief was determined by their long-term strategic vision of the evolution of information systems away from mainframes into communication networks, distributed processing and personal computers. Therefore, they believed it was essential to preserve and develop Toshiba's core competencies, represented by a group of dedicated computer engineers and marketing persons in the Ome factory. This goal was achieved by developing new communication and process computers, optical readers, and Japanese word processors, and by opportunistic marketing of these products and miscellaneous peripherals, such as printers.

TABLE 1 Phases, Key Events, and Entrepreneurial Actions of Toshiba's PC Business

Phase	Date	Critical Events	Entrepreneurial Actions
1. Latency	1978	<ul style="list-style-type: none"> • Withdraw from mainframes • Shift to distributed systems • Keep computer development group 	<ul style="list-style-type: none"> • Develop long-term vision of the business • Preserve core competencies • Opportunistic marketing
2. First stillbirth	1978	<ul style="list-style-type: none"> • Mizoguchi develops first Japanese PC, but headquarters vetoes commercialization in Japan 	<ul style="list-style-type: none"> • First unsuccessful attempt to attack U.S. OEM market
3. Second stillbirth	1979–81	<ul style="list-style-type: none"> • NEC succeeds with first Japanese PC line • Toshiba launches Pasopia 7 and fails miserably in Japan 	<ul style="list-style-type: none"> • Obtain permission to develop and commercialize Pasopia 7 • Second unsuccessful attempt to attack U.S. OEM market
4. Conception	1983	<ul style="list-style-type: none"> • Mizoguchi with 5 teams visits the United States, conceives a portable fully IBM-compatible PC 	<ul style="list-style-type: none"> • Develop "back to the future" design approach
5. Gestation	1983	<ul style="list-style-type: none"> • Requests for development funds denied by headquarters • Headquarters vetoes transfer of personnel to project 	<ul style="list-style-type: none"> • Start "under the table" laptop project (Mizoguchi) • Keep project small and maintain profitability (GM Koga)
6. Birth of laptop (first child)	1985–86	<ul style="list-style-type: none"> • Europe marketing VP Nishida sees prototype, commits to sell 10,000 in first year • 10,000 units sold in 14 months, "King of Laptops" award • Headquarters deny funds for attacking U.S. market • Success in the United States 	<ul style="list-style-type: none"> • Decision to build 7 prototypes for Nishida, who obtains software and distribution channels in Europe • Development of complete product line • Nishida funds U.S. market development with Europe profits
7. Adolescence	1987–88	<ul style="list-style-type: none"> • Creation of new Information Processing and Control Group, with Mizushima as VP and Koga as Deputy VP • Corporate committee for marketing the laptop • Success in Japan 	<ul style="list-style-type: none"> • Accept reincorporation as mainstream business but maintain autonomy and initiative • Develop Japanese version of laptop
8. Birth of notebook (second-child)	1989	<ul style="list-style-type: none"> • Emergence of competitors, loss of market share • Success worldwide 	<ul style="list-style-type: none"> • Mizoguchi develops "under the table" the notebook to attack both corporate and consumer markets
9. Adulthood	1990–96	<ul style="list-style-type: none"> • Merger with word-processor business. Promotions of all corporate entrepreneurs (Koga to Senior VP and Member of the Board) • Launching of Advanced I Project 	<ul style="list-style-type: none"> • Continue technological innovation and entrepreneurial development of subnotebook, palmtop, and multimedia PCs

Phase 2: First Stillbirth

Like Apple I in the United States, the first microprocessors in Japan were offered as kits. In 1977 Mizoguchi visited hobby shops in the Ginza to try out various computer kits and quickly recognized their drawbacks. As a result, he developed the first Japanese ready-to-use general purpose PC. However, Toshiba headquarters denied his request to commercialize this PC in Japan and would only authorize exploration of original

equipment manufacturer (OEM) sales in the United States. After this product received high praise at various trade shows in 1978, negotiations were started with several U.S. companies, but failed because of financial and legal considerations.

Phase 3: Second Stillbirth

One and a half years later, NEC introduced its first PC in Japan, which was an immediate success. Within two years other companies entered the Japanese PC market, including Hitachi, Oki, Sharp, Fujitsu, and Toshiba. The Toshiba engineers, although they had lost the chance to be first to market, believed they were technologically superior to their competitors. Toshiba invested heavily in the Pasopia 7, which was introduced in 1981, but failed miserably because it was not compatible with NEC or IBM, the two de facto standards in Japan. Rather than give up, however, the Toshiba group returned to the U.S. OEM market with an English version of the PC. Again they failed because of incompatibility with IBM and lack of application software.

Phase 4: Conception

In 1983 Koga was named general manager of the Computer Business Division with responsibility for all Toshiba computer lines and peripherals except process computers. Koga continued to believe that PCs would become a core business and decided not to abandon the PC segment of his market. Through repeated failures, his group had learned that they needed a “brighter blue” product—that is, one fully compatible with, but better, than IBM. Therefore, Koga and Mizoguchi decided to restart the PC business from scratch and, because of NEC’s dominance of the Japanese market, to attack the U.S. and European markets first with a major technological innovation: a fully IBM-compatible portable “laptop” computer. To achieve their goal, Mizoguchi used his “back to the future” market-research and design process, according to the six steps described in Table 2.

TABLE 2 Mizoguchi’s “Back to the Future” Market Research and Design Process

Step	Description	Application to Laptop
1	Field market study.	Five teams of engineers and sales persons visited U.S. dealers and users.
2	Development of product concept that will ensure product leadership five years ahead.	Basic concepts: (1) full compatibility with IBM and clones. (2) downsizing and true portability.
3	Stringent specifications become design constraints that cannot be changed.	Specifications for size, weight, battery capacity, display, 3.5” disk, etc.
4	Design is improved through subsequent iteration to satisfy the main constraints.	Size and weight specifications were met, while it was believed that users would pay a price premium for portability.
5	Series of compatible models to firmly implant the brand name in the marketplace.	Complete product line of English version and Japanese version laptops.
6	Development of improved or new models to keep two years ahead of competition.	Development and launch of the notebook computer.

Phase 5: Gestation

The objective was to design and build a fully IBM-compatible laptop in 18 months. Mizoguchi appointed Ginzo Yamazaki as leader of a small task force to start work immediately. However, the project was vetoed twice by Tokyo headquarters, which was unwilling to authorize a third PC attempt after the two previous failures. First, funds were denied for the new project. Second, Toshiba was suffering from a shortage of engineers, and the Technology Executive refused to authorize shifting engineers, even if funds for this project had been available. So, Mizoguchi and Yamazaki, with Koga's blessing, decided to start the project "under the table" by diverting funds and shifting 10 engineers from projects related to military specification devices and the prototype was ready within 24 months. Two factors contributed to the lack of interest and the noninterference from headquarters: (1) the distant location of the Ome factory and (2) the profitability of the computer division. Koga recalls:

Office minicomputers, distributed processing, and optical character recognition systems gave us a strong profitable business foundation. In addition, our peripheral lines were quite profitable and helped us keep our dealer channels open. If top management had seen large losses in the development of the new PC laptop line, they would have told us to stop. But our losses were small, and we made sure they stayed small. Top management trusted us and did not interfere.

In April, 1985, the laptop computer was ready and the project was reluctantly accepted by headquarters. However, they would only authorize a third attempt to enter the U.S. and European OEM markets. Attempts failed because dealers believed portable computers were just a "fad" or small market niche. Headquarters wanted to stop the project, but Mizoguchi and the development team fought back, stating:

Downsizing will be the next trend in the market. Instead of retreating now and wasting all our efforts, we should try to sell, no matter how small the volume might be. That would give us the pioneering position in the era of downsizing.

Phase 6: Birth of Laptop (First Child)

Atsutoshi Nishida was Senior Vice President of Toshiba Europe, in charge of all computer-related operations. Every three months he visited the Ome factory for integration meetings with engineering and production. At one of these meetings, Nishida was shown prototypes of the laptop. He was enthusiastic about the new product which he believed would greatly expand his market, now limited to peripherals and printers. Nishida said:

Make me seven prototypes that I can show around Europe and I will commit to sell 10,000 units the first year.

Because of the repeated failures with OEMs, Nishida actually proposed to distribute the laptop to the end-user market under Toshiba's own brand, a risky strategy, in view of Toshiba's lack of image, application software, customer base, and PC distribution channels. However, the reaction of the Ome project team was immediately positive:

If Nishida says that he can sell 10,000, he will sell them! Let's go ahead!

The seven prototypes were built in a few days and given to Nishida. He used them for demonstrations and to obtain software and distribution channels in Europe. After five

visits, Nishida persuaded the two leading software houses, Lotus and Ashton-Tate, to transfer their most popular software from the standard 5-inch drive to the new 3.5-inch drive. For distribution channels and a sales network, Nishida selected the best in Europe: the IBM dealers in each country. His message was:

Desktop from IBM and laptop from Toshiba! These are complementary products, and there is no competition between them. In fact, now you have the opportunity of selling two computers to the same customers!

Thanks to his energetic salesmanship and persistence, it took Nishida only 14 months to sell the first 10,000 units. The next logical step was to attack the U.S. market, where the laptop had already received two major awards at computer shows. However, Toshiba headquarters would not authorize major expenditures to reenter this market after the history of failures. Nishida, although responsible for Europe only, offered his hard-earned profits to test the U.S. market with 3,000 units. He recalls:

I believed that this was in the best interest of Toshiba and that our presence in the world's largest market, the United States, would enable us to conquer the entire world and re-enter the Japanese market.

The laptop line was as successful in the United States as it had been in Europe. In 1988, Toshiba was the market leader in the portable PC segment with 38% share in Europe and 21% in the United States. Zenith followed with 13% in Europe and 19% in United States.

Phase 7: Adolescence

The success of the laptop in Europe and the United States had an unexpected side effect at Toshiba headquarters. Top executives of other Toshiba businesses heard praises for the laptop from their customers and were finally convinced that this time the computer business would succeed. A company-wide committee to promote the laptop was formed and an extra-budget fund for promotion of new business development, up to that time reserved for research projects, was allocated for marketing the laptop in Japan.

The PC business was now a healthy adolescent, and it was time to reincorporate this young maverick into the adult community of mainstream operations, a difficult transition. Koga's office and communications computer division were merged with the process control computer business to create a new Information Processing and Control Group. A senior executive, Kunika Mizushima, was named group VP, and Koga was named deputy VP. Mizushima's first task was to ensure a successful transition and marshal new resources from corporate headquarters to promote and market the Japanese version of the laptop. This product was successfully introduced in October, 1986, as a joint effort of Toshiba and seven software vendors with 22 application packages. To overcome its poor image that had been created by the failure of the Pasopia series, Toshiba first targeted large corporations and only later the retail market. In 1989, 26% of all PC sales in Japan were laptops and Toshiba enjoyed a 46% share of this rapidly growing market segment.

Phase 8: Birth of the Notebook (Second Child)

The impact of the laptop in Japan was tremendous, and a new market was created. However, major competitors, such as NEC and Seiko-Epson, reacted quickly and Toshiba's

market share of portables fell to 33% in 1990. Therefore, Mizoguchi decided to restart the “back to the future” process and develop a second technological innovation, the notebook computer. This would be a fully IBM-compatible product that was not only truly portable, but small enough and light enough to be easily thrown. The specifications, as compared to the laptop, were very stringent. The footprint would be about 30% shorter and 55% as thick, and the weight less than half, but the software would remain fully compatible. In addition, the notebook would have a “resume” capability to speed up start-ups and shut-downs while working for short periods of time, for instance during sales calls. Price had not been a major constraint for the laptop, but for the notebook the limit was set at less than 200,000 yen, about \$1,500 at that time.

Now that the PC business had achieved credibility and was part of mainstream operations, there was little doubt that headquarters would have blessed this new project. Nonetheless, Mizoguchi opted for a second “under the table” project, supported by Koga but unknown to headquarters. The stated reason for his decision was to maintain security and avoid tipping off the main rival NEC and other competitors. A small group of engineers led by Hirohiko Banno was charged with the development of the notebook computer according to the “cast-in-concrete” specifications described above. The “formal” project, blessed by Tokyo headquarters, officially began six months later with a one-year deadline.

Banno’s group did such a good job that within six months they had completed a prototype that met almost all the specifications with a projected cost considerably lower than the original target. Mizoguchi, never one to miss an opportunity, decided to use this unexpected cost allowance to add a dictionary read only memory (ROM) to help convert texts typed in phonetic symbols (kana).

Along with the technological innovations, a marketing innovation was needed to introduce the new PC and bypass the distribution channels of NEC, the dominant competitor in Japan. Toshiba targeted two market segments: (1) customers who already had a laptop in the office and who needed a second machine to carry with them, and (2) people who did not yet own a PC, but who might try a notebook because of its favorable price, portability and user friendliness. For the first group a “push” sales strategy through corporate sales offices would continue to be appropriate. For the second group, a “pull” strategy was developed that would create a flow of customer demands into Toshiba’s consumer products retail stores. The Dynabook was launched in June, 1981, and within the first nine months 77,200 units were sold, double the original target.

Phase 9: Adulthood

The laptop and notebook computers rejuvenated the already maturing PC market and significantly increased its size and growth rate. The catchphrase of laptops was “from the era of the fixed computer and people moving around to the era of moving computers with people.” This concept came into being with the notebook. Not only did it strengthen the “one person—one PC” market but it also opened a new market of “one person—one desktop at the office plus one notebook computer on the go.” At this time, it is too early to assess Toshiba’s progress during the past five years, but the company continues to lead in miniaturization. The new Pentium-powered subnotebook was judged the leader in its market segment (Wildstrom 1995), and Mizoguchi is developing new palm top and multimedia products.

Of significant interest are recent changes in the Toshiba organization. In 1993, Koga was named a member of the Board of Directors and Senior VP in charge of the Informa-

tion Systems and Control Group with responsibility for word processors and multimedia.¹ Recently (1996) Koga was promoted to Senior Executive VP in charge of Information and Communications Systems and Deputy VP of Toshiba's new showcase project "Advanced I" (Information, Integration, and Intelligence). In parallel, Mizoguchi was first promoted to General Manager of the PC Division and recently (1996) to Member of the Board, VP, and Group Executive-Information Equipment Group. Nishida was promoted first to International Marketing Manager and recently to General Manager of the PC Division to succeed Mizoguchi. Banno was promoted to Technology Executive of the PC Division. Yamazaki was also promoted to Technology Executive, but of the Semiconductor Group with which he had worked in specifying and designing unique circuits for the laptop and notebook.

DISCUSSION

The framework that was presented earlier can be used to analyze the unusual aspects of this case, with an emphasis on the evolving role of champions.

"Under the Table" or "Underground" Innovation and "Skunkworks"

Business folklore credits many discontinuous innovations to corporate entrepreneurs who fight their way through the maze of company bureaucracy to emerge as winners in the marketplace. According to Richard Foster of McKinsey Company, however, this scenario happens only one time in 30 (Kiechel 1988). Even rarer is the case where a successful innovation was not only opposed, but nipped in the bud by company management. There is limited anecdotal evidence for such cases in "war stories" told by chief executives to employees to promote innovation. For instance, David Packard, during one of his yearly visits to the laboratory as CEO of Hewlett Packard, told researcher Chuck House to stop his development of a large-screen electrostatic display, stating, "When I come back next year I do not want to see that project in the lab!" (Pinchot 1985, p. 27). Through extraordinary efforts, House was able to transfer the project to production before Packard's next visit and later received a medal from the CEO for "extraordinary contempt and defiance beyond the normal call of engineering duty" (Packard 1995, p. 108). Lou Lehr, CEO of 3M, relates a similar story of a laboratory man "who was fired, but still came to work on his pet project . . . The stubborn employee ultimately retired as the vice president of this very successful operation" (Lehr 1979).

In contrast to these unusual cases, the world of business abounds with frustrated innovators who stopped work as ordered and returned to their routine tasks or left the company and started spinoffs (Roberts 1991), some of which, like Apple, achieved spectacular success (Moritz 1984). In Japan, open defiance of authority would appear even more improbable, given the Confucian ethic of obedience toward superiors and the possibility of "losing face." Nevertheless, the Toshiba laptop project was forbidden twice by headquarters, and started "under the table" or, to use an American term "underground" (Aram 1973). Underground innovation is often equated with "skunkworks" (Peters and Waterman 1982, pp. 211-212; Burgelman 1983a). However, most skunkworks are not hidden from management and in some cases are even encouraged by top executives

¹ Because of the complexity of the Japanese language, word processing is performed by specialized units, whose sales are twice those of PCs.

who are frustrated with company bureaucracy and the slow response of the organization to major challenges. All of the "Three Skunks" described by Peters and Austin (1985, pp. 161-168) were actually aided and abetted by high-level management. Tom West, the project leader of Data General's new machine (Kidder 1981), first sought and received the approval of the vice president and then used this legitimization to spur his team into action. The Lockheed skunkworks was the brainchild of William Johnson, who "organized the division in 1943 to design, build, and prove the first tactical fighter in the United States," hardly an underground project. This division continued, in name only, as skunkworks for 20 years. In a similar vein, Gerhardt Neumann, the executive in charge of GE's multi-billion dollar aircraft engine group, relates (1984) how he ran the variable Sector Experimental Engine project of 120 people as giant skunkworks.

In contrast, the laptop project by necessity had to be hidden from headquarters and carried out under a tight budget of people, money, and time. These constraints created a "pressure cooker" atmosphere where Mizoguchi thrived, as shown by this typical episode. One Friday afternoon, the exhausted engineers were unable to find space for one more device in the jam-packed laptop prototype. Mizoguchi ripped the cover off, poured a glass of water inside (thereby ruining all the circuits!), and turned the box upside down. A few drops of water came out, and Mizoguchi exclaimed "See, there is some space left! Work smarter!" The external circumstances compelled the laptop team to go underground and operate as skunkworks because they had no choice, but they turned the resulting constraints to their advantage and made the most of it.

Unexpected Success of Both the Laptop and Notebook

The famous scientist and innovator Louis Pasteur stated "chance favors the mind that is prepared" (Vallery-Radot 1923). This certainly applies to the small laptop team in the Ome factory. The first model was quickly followed by advanced versions, all of which received awards in Europe and the United States. Production increased from 5,000 units per month in 1986 to 100,000 in 1989. The notebook, also developed "under the table," was equally successful, with initial sales double the amount forecasted.

This sequence of uninterrupted successes is more the exception than the rule in the history of PCs. For instance, Apple II was a great success, but Apple III was a disaster with 40% of all units shipped failing during the first month of operation (Gable and Tylka 1983). Apple IIe was successful, but Lisa was a failure, and Macintosh an enduring success (Swanger and Maidique 1985). Similarly, the first IBM PC was successful, overtaking Apple for a while, while the PC Junior (disparagingly nicknamed "the Peanut") was a failure, even after IBM redesigned the keyboard and cut the price substantially (Carroll 1993). Even the much advertised new PS/2 series did not restore IBM leadership (Sultan 1990). Reasons for this "failing second product syndrome" can be found by analyzing new-product risk (Abetti and Stuart 1989). In brief, if the technical, market and functional risks are held constant, the higher the uniqueness of the innovation, the lower the risk of introducing the new product. The laptop had a high level of innovation, just like the first IBM PC. However, the relative innovation level of the second product must be compared with the first, which has become the new benchmark. The IBM PC Junior did not provide any innovative functions compared to the original PC or to the competition and appeared to be a cheap toy, incompatible with the image of IBM, a serious company selling primarily to business and industrial markets. In contrast, as we have seen, the notebook provided many additional functional advantages (size, weight,

true portability, resume function) and thus represented a technological innovation compared to the laptop.

THE CHAMPIONING PROCESS

The role of champions in the management of innovation has been discussed in the literature from various viewpoints: the process (Manz et al. 1989), the journey (Angle and Van de Ven 1989), the role of product champions (Chakrabarti 1974), executive champions (Maidique 1980), top executives (Nonaka and Yamanouchi 1989), the relationships between entrepreneurs and champions (Maidique 1980), the division of labor between experts, champions, and sponsors (Chakrabarti and Hauschildt 1989), the role of champions in new product innovations (Souder 1987, pp. 101-115). The roles of champions and sponsors for successful corporate entrepreneurship has been discussed by Rothwell et al. (1974), Roberts (1980), Burgelman (1983a), Kanter (1983), Quinn (1985), Nonaka and Yamanouchi (1989), Block and MacMillan (1993). A generally accepted dichotomy contrasts "bottom up" with "top down" championing (Day 1994). Other researchers have emphasized dual-role or multiple-role championing (Witte 1977; Souder 1981; Quinn 1985; Angle and Van de Ven 1989). Venkatamaran et al. (1992) have expanded this definition of multiple roles by discussing the dynamic, rather than static, evolution of championing roles. This work and a comprehensive study by Day (1994) of the different processes for championing innovative corporate venturing appear to be most useful for analyzing the championing roles within the Toshiba case.

Day's first hypothesis is: "The lower the principal champion's hierarchical level, the more innovative the venture will be." The laptop project was started by Mizoguchi, a skilled engineer whose hierarchical level was relatively low. Only several years later he was promoted to general manager and moved to headquarters. Thus Day's first hypothesis is strongly supported. Day's second hypothesis, which concerns champions from corporate headquarters, is not applicable, because headquarters had no knowledge of the project. Day's third hypothesis, "Within corporate headquarters, the higher the level of the principal champion...the greater the innovativeness of the venture," is also supported. After the project had been successfully launched, the hostility of executives turned to enthusiastic support. According to Day (1994, p. 151), "As retroactive legitimizers, top managers enforce only those ventures that are proven successes, and then only after they have established themselves as such." In this case, once top management decided to legitimize the project, they did so skillfully. Because Koga was still young and low in the hierarchy, he could not have been promoted immediately to Group VP, in spite of his recognized accomplishments as general manager. The job was instead given to Mizushima, a member of the board and an executive of the Power Group, where most of Toshiba's corporate executives had grown up. Mizushima stated:

In relation to the laptop, my job was to promote the initiatives of Mizoguchi and Nishida as part of Toshiba New Business Development Venture, a corporate program. I obtained resources from R&D, engineering, marketing, advertising, and sales promotion. I was also a member of the Computer Strategic Promotion Committee.

Thanks to his high position and network of relationships with the other top Toshiba executives and the board, Mizushima was effective in reincorporating and reintegrating the maverick PC business into the corporate mainstream. Koga, as Deputy Group VP, learned from his mentor "how to navigate the sociopolitical environment inside the corporation" (Venkatamaran et al. 1992) and succeeded Mizushima in 1992. Whereas

TABLE 3 Evolution of the Championing Process

Phase	Date	Champion	Role
1. Ideas	1983	Mizoguchi	<ul style="list-style-type: none"> • Develop “back to the future” approach and gain acceptance by engineering team
2. Opportunistic behavior	1984	Koga	<ul style="list-style-type: none"> • Continuously probe OEM and other markets in the United States and Europe • Condone rule bending and protect team from interference by headquarters
3. Resources	1985–86	Koga	<ul style="list-style-type: none"> • Maintain profitability of computer business and divert resources to entrepreneurial team • Keep the team small, to conserve resources • Enlist the enthusiastic support of Europe and United States marketing
4. Incorporation	1987–88	Mizushima	<ul style="list-style-type: none"> • Obtain corporate acceptance of the new venture • Legitimize the new venture as part of mainstream • Marshall extraordinary corporate resources for rapid growth

Day's fourth hypothesis is not directly applicable, she states that “complex, science-based, technology ventures thrive best with a division of championing roles,” one being the principal champion and the other the organizational sponsor. We have seen that Mizoguchi fulfilled the first role, whereas Koga acted as sponsor for Mizoguchi and his team and protected them from interference by the higher levels of the organization. In summary, this case validates two of Day's hypotheses and does not conflict with the other two.

Evolution of Championing Roles during the Corporate Venturing Process

According to Venkatamaram et al. (1992), “four kinds of championing roles emerge as critical if new venture ideas are to survive the organizational imperative: championing ideas, championing opportunistic behavior, championing resources, and championing incorporation.” In Table 3 we analyze the evolution of the championing roles from 1985 (birth of the laptop) to 1988 (legitimization). We can clearly observe the hypothesized change of championing roles from Mizoguchi (phase 1) to Koga (phases 2 and 3) and then to Mizushima (phase 4). However, this changing of roles is not a simple passing of the baton in a relay race. Rather, Mizoguchi, in spite of promotions, continued in his role of championing ideas by conceiving the designs of two more discontinuous innovations, the notebook and later the palmtop. In parallel, Koga continued to probe new markets opportunistically, for instance the rapidly growing and evolving multimedia field. He also continued to obtain resources for the rapid development of new products (e.g., the subnotebook), for joint ventures and acquisitions in multimedia and for the showcase “Advanced I” corporate project. We can conclude that, at least in the present case, champions do not relinquish to others their original roles, but rather continue to expand these roles to grow the business and maintain leadership ahead of competition.

Managerial Roles in Promoting the Management of Innovation

Angle and Van de Ven (1989) visualize four roles in the management of innovation, distributed according to a diamond-shaped relationship. At the top is the institutional

leader who is “concerned with the innovation as only one of many responsibilities.” This was Koga’s role after he was named general manager of the Computer Division, responsible for communication and distributed computers, peripherals, military projects, OEM sales, and of course the struggling PC business. At the bottom of the diamond is the innovator/manager/entrepreneur, Mizoguchi. At the intermediate level, there are two opposing roles, the sponsor-mentor and the critic. In our case, these two roles are hard to identify and isolate because of the small size and low visibility of the “under the table” project. Koga acted also as sponsor-mentor by providing direct supervision and counsel. The role of the critic, albeit an enthusiastic one, was assumed by Nishida who performed “reality testing of the innovation against hard-nosed criteria” (the marketplace in Europe). After legitimization Mizushima became the institutional leader, Mizoguchi continued as innovator/manager/entrepreneur, Koga as sponsor and mentor, and the marketing managers in Europe, the United States and Japan as critics.

Summary

The three models discussed above were not developed specifically for “underground” innovation. Nevertheless both the Day and Venkatamaran et al. models provide insight and value to the interpretation of the Toshiba case. In fact, the most appropriate model may be a combination of the two models, emphasizing multiple championing roles and the transfer of the lead role from one champion to the next during the corporate entrepreneurship process. In contrast, the Angle and Van de Ven model appears to be applicable only after the underground project has emerged.

STRATEGIC ANALYSIS

Morone’s model (1993) is useful to describe and analyze Toshiba’s strategy for achieving worldwide leadership in the portable PC market. This model proposes that the vision of general management determines first business strategy and then technological strategy.

Business Strategy

Toshiba’s management was driven by the strategic vision that computers and information systems would continue for many years to present a major opportunity for Toshiba that was well matched to the technical and business strengths of the company. The following statement is typical of several general managers and technology executives who were interviewed:²

In our opinion GE made two major mistakes: abandonment of the computer and semiconductor businesses. These are the key present and future core technologies of GE and Toshiba. We kept them both and now they contribute highly to our profits.

Toshiba’s strategic vision was a bit blurry since the future directions of computer and information systems technology and markets were only vaguely defined. Nonetheless, it was pragmatic and was articulated as clear implementation directives. Toshiba should:

1. Stay in the business, even if only in market niches, because this would be the only way

²Survey by the author, Tokyo, November 1991.

to preserve and develop its core competencies and skills in computer engineering, manufacturing, and marketing.

2. Continuously test new markets with new technical and business approaches, until the right ones for Toshiba are found—in effect “learn by doing.”
3. Strive to maintain at least marginal profitability, to justify the continued existence of the computer business to corporate management.

The evolving business strategy of Toshiba's computer businesses is summarized in Figure 1. The long-range strategic vision of the business ensured the cohesiveness and continuity of the management team, whose main objective was to preserve and enhance the core competencies and skills of the business. This objective was attained by opportunistic marketing, which allowed learning by doing while maintaining profitability and credibility with headquarters. As shown by the three loops, throughout the “learning by doing” process there was continuous feedback for modifying and fine tuning the marketing approach, for growing the core competencies and skills, and for refining the blurred strategic vision of the computer business. Thanks to this learning and feedback process, the computer management team was ready to move as soon as the right opportunity was created by Nishida's visit to the Ome factory. Prepared by the experience gained from past failures, the computer management team recognized and seized this opportunity, moved expeditiously, and the laptop was born to succeed. This first success in turn refined their vision (fourth loop) to further attack market opportunities with the notebook.

Technology Strategy

Initially, the technology strategy of Toshiba's computer business was not different from that of many other new entrants. Toshiba was a company of engineers, and it was natural that engineers would develop product specifications based on their technical abilities and preferences, rather than market inputs. The inadequacy of this “technology push” approach became painfully evident when Pasopia failed and no OEM contracts could be obtained in the United States. After Mizoguchi's trip to the United States, the technology strategy was shaped, constrained and driven by the business strategy: a fully IBM-compatible PC with the unique advantage of portability. The objective of the new technology strategy was, and still is “to achieve and maintain world-wide technology leadership within the constraints set up by the business strategy.” Naturally, many of these constraints such as compatibility with IBM standards and size and weight limitations, may seem like unwise and unnecessary limitations to designers. It was the champion's role to convert these limitations into challenges that would stimulate the creativity and ingenuity of the design and development engineers. As we have seen, Mizoguchi thrived and excelled in this role.

The design and development process of first the laptop and then the notebook computer clearly illustrates the key elements of this highly creative and rigorous technological strategy. The desired product is first visualized by creative intuition as it might appear five years later, based both on the perceived evolving needs of the marketplace and the forecasted advances in technology. General inputs are obtained from all sources—customers, dealers, competitors, suppliers—but no formal market research is performed, since it would be worthless (Tauber 1974). There are also no formal reviews of the proposed project by the corporate strategic planning, marketing, sales, and financial

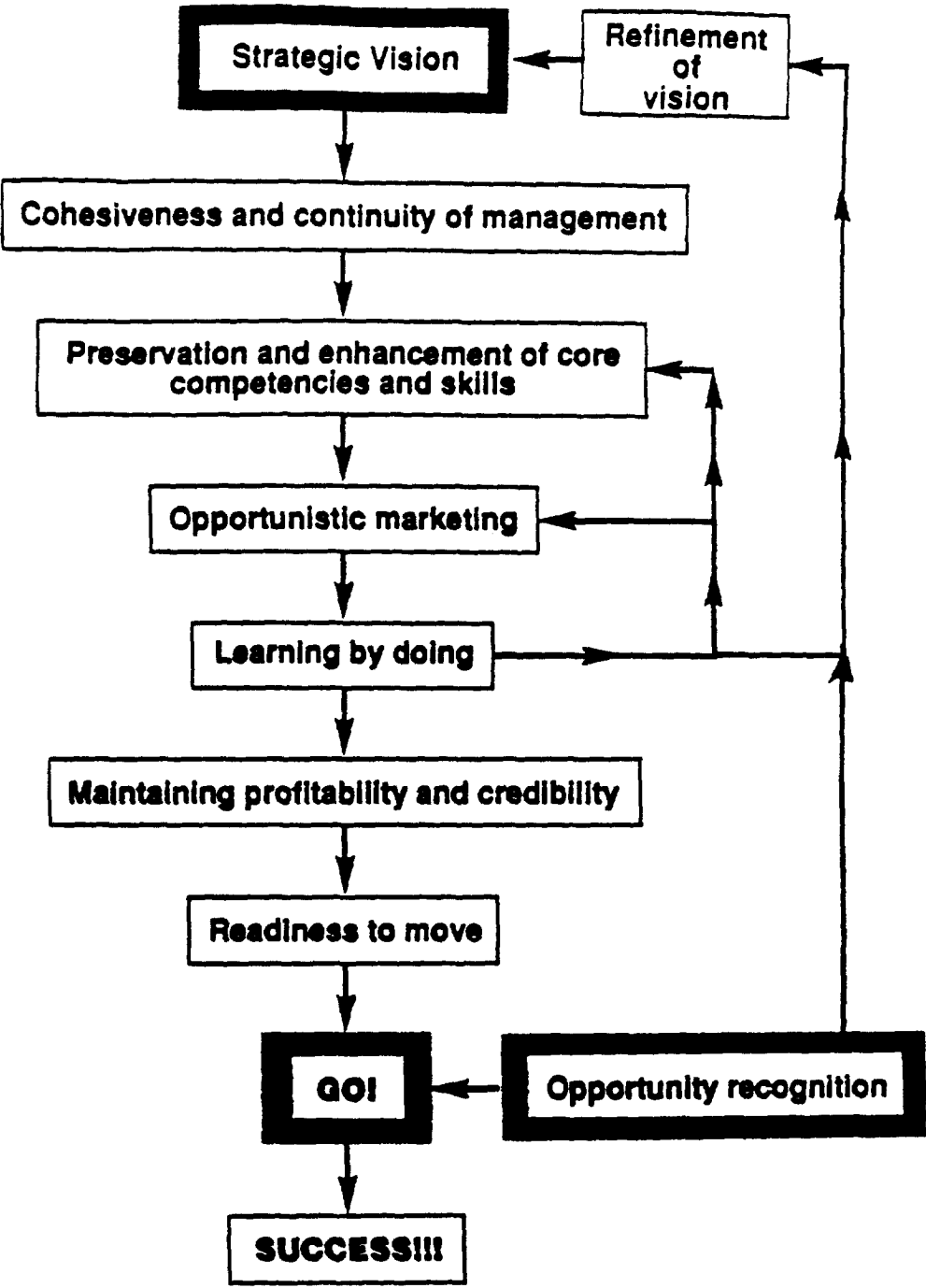


FIGURE 1 Evolution of Toshiba's computer business strategy.

functions. Note that continuity of management, core competencies, and experience in the marketplace are critical to the successful application of creative intuition.

With this “back to the future” strategy, the traditional roles of design and development engineering are interchanged, both in time and in importance. In the classical “technology push” strategy, development and engineering of new technologies, new product concepts, and new major components all come before the design process. Tentative specifications of the prototype are established, based on the actual or expected results of research and development. Then the design process starts in earnest, with some feedback to research and development, to better satisfy functional specifications, control costs, improve reliability and ease of use, and so on. In contrast, with the “back to the future” process, once the design has been developed by a multifunctional team and frozen, research and development are told which components must be developed or acquired externally. Therefore, technology is now driven by the market requirements, as projected five years into the future. This process of first design and then development is very similar to Motorola’s technology road mapping process (Willyard and McClees 1987) but less formalized and more intuitive in the present case.

The evolving technology strategy of Toshiba’s computer business is summarized in Figure 2. Looking again at the lower portion of Figure 1, the business strategy and opportunity recognition are the inputs to the “GO!” decision. As shown in the upper portion of Figure 2, they are also the inputs to the technology strategy. Figure 2 shows two feedback loops: (1) on the right, the goal of keeping two years ahead of competition provides inputs for modification of the original design and specifications for continuous developments of new components and techniques, and for revision of “make or buy” decisions; and (2) on the left, the presence of worldwide R&D and production facilities provides new alternative sources for the components and technologies required by the improved designs, and for reviewing “make or buy” decisions on the basis of increasing the local content of the products marketed in Europe and the United States.

CULTURAL CONTEXT AND CRITICAL SUCCESS FACTORS

Many corporate ventures achieve initial technical, market, and financial success but fail to realize their full potential after reincorporation into the mainstream business. In fact, this reincorporation within the traditional company organization is a difficult process as shown by IBM’s experience with the PC venture (Carroll 1993), the slow absorption of the Macintosh into Apple (Feddelier et al. 1990), the inability of Alcoa to manage the Merlin-Gerin foundry (Badguerahanian and Abetti 1995), and the failure of Kodak’s ambitious plan of diversification through corporate venturing (Kanter et al. 1991). In most cases, the entrepreneurs left because they had thrived on freedom and could not work again within the corporate bureaucracy. In contrast, reincorporation of the PC venture into Toshiba’s new main line of the information systems business proceeded smoothly, and all the entrepreneurs and champions stayed, took on new challenges, and were repeatedly promoted. The success of this corporate venture may be attributed to several factors: (1) the Japanese national, social, and business culture, (2) the organizational setting and culture of Toshiba, and (3) the personalities, background, and business experiences of the entrepreneurs.

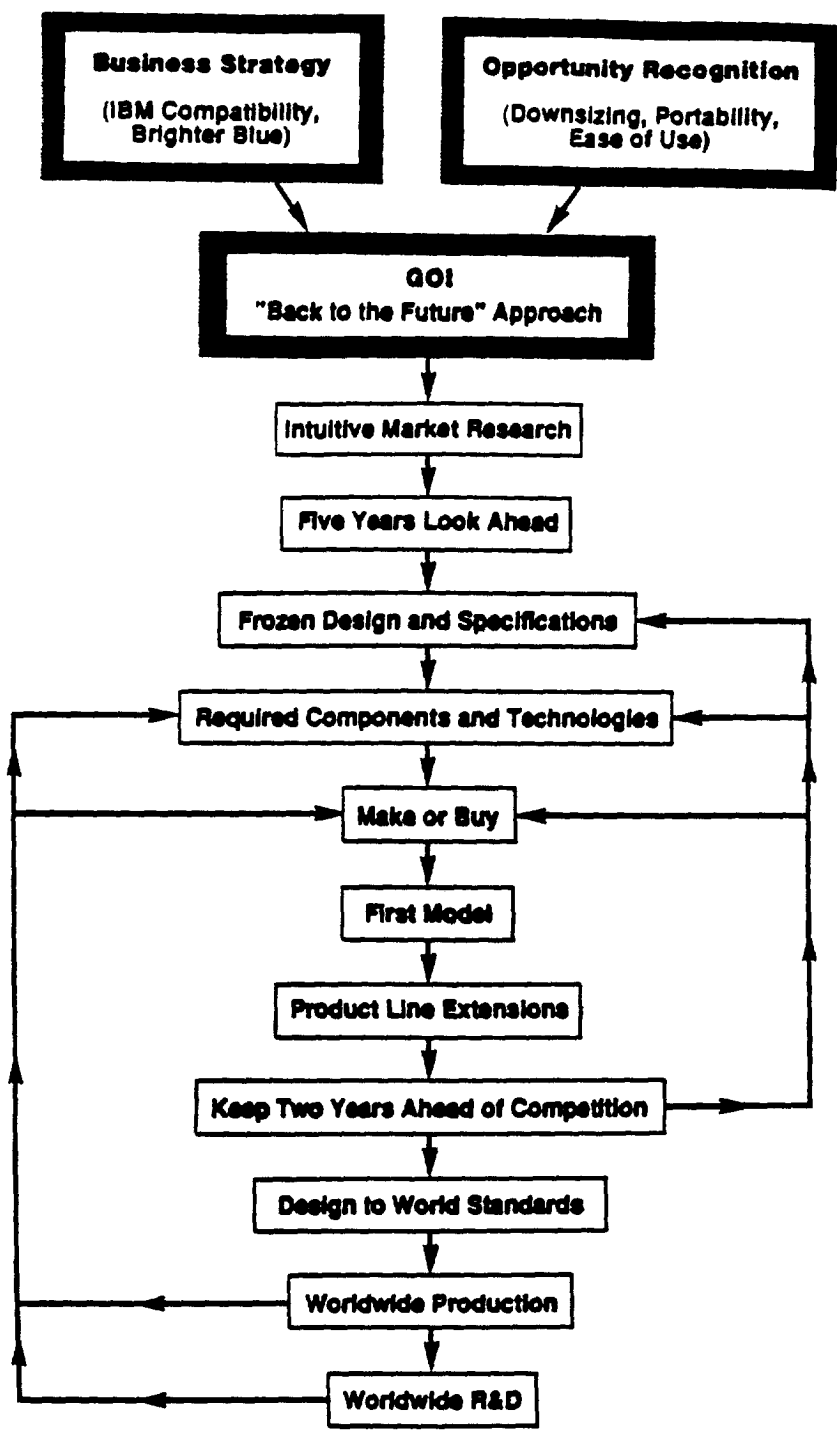


FIGURE 2 Evolution of Toshiba's computer technology strategy.

The Japanese Context

By the early 1980s, Japan had absorbed Western technology and was eager to develop its own in order to conquer international markets. The limited domestic computer market was already well served by IBM, NEC, and other competitors of Toshiba. This context spurred the entrepreneurs to attack first the European market, where competition was weaker than in the United States, and last the Japanese market. At the same time, the word processor (WP), laptop, and notebook concepts were conditioned by the Japanese environment. Due to crowded offices and small homes, small appliances were the norm. Furthermore, the Japanese work ethic and peer pressure compelled many professionals to bring work home. Therefore, the market was receptive to, and willing to pay a premium for, small portable WPs and PCs.

Another factor that contributed to success was the Japanese business culture in which engineers and managers are expected to remain for life with the same company. Thus, it is not surprising that the entrepreneurs stayed with Toshiba.

The Toshiba Context

Toshiba was founded in 1875 as an electrical company and remained such until after the Second World War. Traditionally, electrical power engineers were the dominant group among Toshiba's top executives. Nonetheless, following General Electric's example, Toshiba recognized the need to diversify into computers, medical electronics, and plastics. At first, these new businesses were considered outside the "mainstream" electric power business. This worked both against and for the internal venture: against because headquarters distrusted the new high-risk computer business and allocated resources reluctantly, and for because headquarters was not interested in a "second-class" business, and left it alone, as long as it remained profitable and did not create too many waves. However, once headquarters realized that the internal venture was becoming a winner, they appointed Mizushima, who came from the power business, to implement the transition to core business.

Within this context, the question should be raised whether Toshiba, as an organization, learned something from this venture. During several executive seminars in which the present case was discussed, I asked, "Is this case typical of Toshiba?" The unanimous answer was, "No, but we need more like it!"

Personality and Background of the Corporate Entrepreneurs

All the corporate entrepreneurs mentioned in this case had several traits in common. First, they were highly competent engineers, who had graduated from the top technical universities in Japan. Second, according to Toshiba's training policy, they had been rotated through various engineering, manufacturing, and marketing assignments, and thus were able to conceptualize the entire venture, not just the technology. Third, they had spent considerable periods in training in the United States, mostly at the GE computer plant in Phoenix, Arizona.³ Koga was the resident engineer there for two years, and Mizoguchi visited frequently. Since they were young, eager to learn, and open to new ideas, they absorbed not only American technology, but also the American way of doing

³From 1966 to 1970, the author worked at the GE plant and was responsible for business and technical relationships between the GE and Toshiba computer organizations.

business, and the “cowboy” independence typical of the West. When they returned to Japan, they felt stifled by the traditional bureaucratic climate of Toshiba but stuck together as an elite group in the Ome factory, where they kept faith in their vision. Mizoguchi was probably the most different from a typical Japanese professional. A brilliant engineer, he was full of new ideas, not afraid of upsetting others, a hard driver of his team, and he never missed an opportunity. At that time, he appeared to be highly admired, but not loved, by his subordinates. Nishida was a marketing genius and super-salesman, with an unusual international perspective and the desire to do what was best for the company, regardless of his territory.

Koga's background was the broadest, which explains his role as general manager. His father was a respected educator, who founded one of the first high schools in Japan to use Western educational methods. Thus Koga had been exposed to Western culture since his childhood and was selected to lead the Toshiba team of 10 to 12 engineers at the GE plant in Phoenix. After returning to Japan, Koga moved from engineering to product planning and marketing at the Ome plant, close to the real world but away from the bureaucracy of headquarters. His international and marketing experience, persistence, and negotiating abilities, coupled with effective but nonthreatening leadership and consensus building, earned him the confidence of headquarters and early promotion to general manager.

Critical Success Factors

On a broader perspective, the process and the critical factors that determined Toshiba's success may be visualized according to Figure 3. The corporate entrepreneurs and champions were driven away from mainframes by a vision of distributed and interconnected computing that compelled them to focus on personal computers. This focus determined the winning business strategy (fully compatible portable units), which in turn deter-

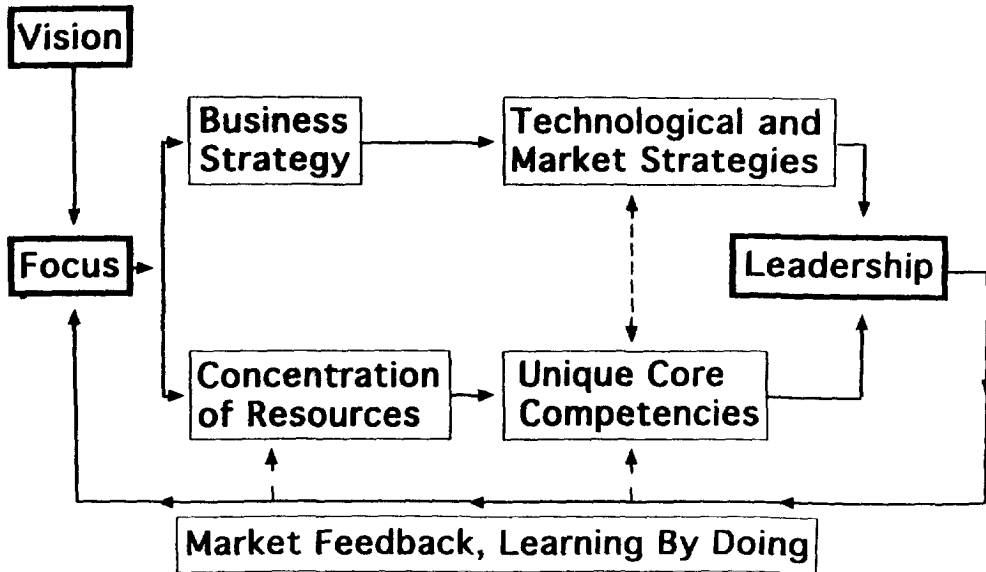


FIGURE 3 Toshiba corporate venturing process and critical success factors.

mined the technological and market strategies (miniaturization and complementarity to IBM). At the same time, this focus also allowed the entrepreneurs to concentrate their scarce resources on the "back to the future" design process and to develop unique core competencies for realizing their goal, including the competence of "bootlegged" internal venturing in the field. This coupling of winning strategies with unique core competencies made possible Toshiba's potential leadership in the marketplace. Actual leadership was achieved through continuous, step-by-step learning by doing and by market feedback that reinforced the adopted strategies and enhanced the core competencies.

In conclusion, six critical factors contributed to the long-term success of this corporate venture: (1) the venture had the potential of achieving worldwide leadership in a mainstream area of the corporation, (2) the PC market in Europe and the United States (but not initially in Japan) was fragmented and highly receptive to unique innovations, (3) the corporate entrepreneurs were driven by a long-range vision of the business, with focused strategies and highly challenging well-defined objectives, (4) the entrepreneurs were persistent and undeterred by early failures in the marketplace and by the distrust and hostility of headquarters, (5) the organizational context, because of slack internal controls, allowed the diversion of funds and manpower to the "under the table" venture, and finally, (6) the entrepreneurs were able to change their roles from underground innovators to product, executive, and corporate champions in order to reinforce, broaden, and implement their vision.

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