KEN OLSEN
Digital Equipment Corporation (DEC)

Introduction

Ken Olsen co-founded the Digital Equipment Corporation (DEC) in 1956. Under his leadership DEC invented and the dominated the minicomputer industry for over 30 years. DEC's success was an impressive technology story and an impressive corporate culture story. It was so impressive that in 1986 *Fortune* named Olsen "America's most successful entrepreneur."

Five years later Olsen resigned under pressure, the victim of DEC's sudden loss of competitiveness due to changes in the market environment.

In spite of that unfortunate ending, Olsen's earlier accomplishments earned him the continued respect and admiration of those who worked for him and those who followed DEC's history closely.

The Founder's Background

Ken Olsen was born in Stratford, Connecticut in 1926. His parents, Oswald and Elizabeth Olsen were second generation Scandinavian immigrants (Norway and Sweden). Ken and his three siblings grew up in a Norwegian working-class community. As an adult, Ken came close to continuing the Scandinavian tradition by marrying Eeva-Lisa Aulikki from Finland.

Ken's father was first a designer of machine tools (He held several patents) and later a machine salesman for Baird Machine Company in Stratford, Connecticut. He had a shop in the basement at home where he taught Ken and his two brothers the basic skills of the trade. "Ken and Stan (Ken's younger brother) spent hours down there, inventing gadgets and repairing their neighbors' broken radios.(Rifkin, p.27).

Ken's father was also, "a fundamentalist by religion and a disciplinarian by nature. He believed in puritan ethics, applied to both life and work. He was known for advising customers not to buy any machine from him that they didn't really need. (Rifkin, p. 27). At DEC many years later, Ken insisted that the sales force not try to sell customers a product that the customer didn't really need.

Ken joined the United States Navy in 1944. He was trained as an electronics technician. In 1947 he left the Navy and enrolled in the engineering program at the Massachusetts Institute of Technology (MIT). He received his bachelor's degree in electrical engineering in 1950 and a master's degree in 1952. (Baron, p. 269).

Ken joined the Park Street Church after entering MIT. The minister, Harold Ockenga, asked Olsen to take charge of the Sunday School program. Olsen did so successfully and in the process awakened a desire to manage.

Olsen had taken his Christianity seriously since childhood. As an adult Christianity continued to be Olsen's primary way of defining himself. That showed up, among other ways, in his modest personal lifestyle; in his active involvement in a Boston area monthly prayer breakfast attended by 40 business executives and in the focus of his charitable contributions on Christian philanthropies (Petre,)

While studying fpr his master's degree Olsen was one of 400 engineers hired to work on an MIT contract with the U.S. government. The MIT unit in charge was named Lincoln Laboratory. MIT's task was to develop a core memory for the proposed American air defense system called SAGE (Semi-Automatic Ground Environment). Olsen was put in charge of a 15 person team that designed a small test computer. The team completed the job ahead of time and Olsen gained recognition as an engineer with management abilities.

The equipment designed by MIT under the SAGE contract was to be manufactured by IBM. Olsen was assigned the job of providing a smooth interface between IBM and MIT. He operated out of an office at IBM. Olsen found IBM to be frustratingly bureaucratic in comparison with the entrepreneurial culture of MIT's Lincoln Laboratory. And out of that frustration came Olsen's inspirational vision of a business opportunity.

The Start-Up

It did not take long for Olsen to turn his vision into a reality. He invited a Lincoln Laboratory colleague, Harlan Anderson, to join him in starting a new company. The plan was to produce for a new niche in the computer industry – low cost, high performance, interactive small computers for use by scientists and engineers. The plan was presented to a Boston area venture capital company named American Research and Development (ARD). ARD required Olsen and Anderson to rework the business plan and then provided the entrepreneurs with $70,000 in return for 70% of the equity of the company. ARD recommended that the word "computer" not be used in the company's name because the impression in the investment community at that time was that nobody made money in the computer business. So the founders chose the name Digital Equipment Corporation (DEC).

ARD's decision to fund DEC came with the strong support of General Georges Doriot, MIT management professor and co-founder of ARD. As part of the funding agreement Doriot assumed the responsibility of advising Olsen during DEC's start-up period. (Rifkin and Harrar, pp.32-34).

With start-up funds in hand Olsen and Anderson leased office and manufacturing space in an old textile mill in Maynard, Massachusetts. They hired Olsen's brother Stan as the third employee and officially divided the work into three parts – Ken Olsen in charge of design, Stan Olsen in charge of manufacturing and Harlan Anderson in charge

of administration. But Ken Olsen was clearly the leader of the group from the start and would soon come to be a dominant leader.

DEC opened for business in 1957. That year they made only printed circuit logic modules and memory test equipment. The equipment was marketed to engineers at universities and research labs. Olsen's first love was engineering innovation and that would always be the top priority at DEC while he was in charge. But he also had an interest in and ability to produce a profit. And so DEC made a small profit its very first year.

Building components and equipment was no more than preparation for the implementation of Olsen's primary vision – creating a new niche in the computer industry. That niche came to be called the mini-computer segment of the computer market. It consisted of low price, high performance machines sold to knowledgeable customers (engineers and scientists) who did not need a lot of software and hand-holding. (Chandler, 104-105). DEC's first family of such computers was known as the PDP line, PDP standing for Programmed Data Processor.

The Financial Story

DEC's financial performance was outstanding into the late 1980s. Total revenue rose to $783.3 million in fiscal year 1976 (ended July 1, 1976) and $ 6.686 billion in fiscal 1986 (The year Olsen was named "America's most successful entrepreneur" by *Fortune).* Earnings per share rose at an annual rate of 30 percent from 1972 to 1982 and at a more modest annual average of 19.5 percent from 1983 to 1988. Cash flow per share grew at a rate of 31.5 percent from 1972 to 1982 and 20.5 percent from 1983 to 1988. The stock price rose from a low of $3.30 in 1967 to a high of $199.5 in 1987 with a 3 for 1 stock split in 1969 , a 3 for 2 stock split in 1976 and a 100 percent dividend in 1986 (Value Line).

By the 1980s international sales represented a significant part of DEC's total. Foreign revenue was already 38 percent of the total in 1981 and rose to 49 percent in 1988 (Value Line). DEC's foreign operations included both sales and manufacturing facilities. Olsen's strategy abroad was to rely heavily on local managers who would be more in tune with unique local conditions.

Growth in revenue slowed significantly in 1989 and DEC responded with a voluntary severance plan for manufacturing employees. It was a modest plan offered to 700 employees at a time when the company employed 125,800 people. In reporting this development The *Wall Street Journal* hinted at the deeper significance of this move by stating, " Like International Business Machines Corp., Digital has a long history of avoiding layoffs …As growth has slowed, profit margins have shrunk and the company has sought to cut costs…As part of its reallocation program, the company disclosed in June a plan to shift as many as 4,000 manufacturing and administrative workers to customer service and sales jobs in the year ending July 1990." (Wilke, 1989).

The situation worsened markedly in fiscal year 1990 and the last quarter, ending in June, produced DEC's first loss in the company's history. That was due both to a revenue decline (from $3.37 billion to $3.49 billion) and a $400 million charge to pay for retraining redundant workers and providing severance pay for some 5,000 to 6,000 workers. For the entire 1990 fiscal year revenue fell to $ 74.4 million compared with a net of $1.07 billion in 1989 (Bulkely,1990).

DEC reported losses for the next two years with restructuring and downsizing costs being a major factor. In fiscal year 1991 DEC incurred restructuring costs of $1.1 billion (Wilke, 1992). By July of 1992 DEC under Olsen had reduced employment to 113,800 with plans to cut another 15,000. That same month Olsen, 66 years old, and at risk of being fired by the board, announced his retirement (Wilke, 1992). Robert Palmer was named to replace Olsen and after two more years of losses the company eked out positive net income of $ 122 million in fiscal 1995. By then employment had been cut to 61,000 people and 25 of DEC's 35 manufacturing plants had been closed (Simons, 1995)

After 1995 DEC's financial performance was spotty – a loss in 1996 followed by a profit in 1997. The basic problem was that DEC no longer had a product line that put the company in a strong competitive position. Then, in June of 1998 Compaq Computer bought the company for $9 billion and DEC ceased to exist (Baron, p.283).

The Technology Story

DEC's history is a story of innovation in the computer industry. The original vision underlying that story was Olsen's. But from 1960 on an equally important source of DEC's technological vision came from Gordon Bell. Chester Gordon Bell was pursuing his doctorate in engineering at MIT when he decided to join DEC as its second computer engineer. He "masterminded virtually all DEC computers including the PDP-4, PDP-5, PDP-6 and PDP-9 before leaving for a sabbatical at Carnegie-Mellon in 1966. He returned as vice president of engineering in 1972." (Rifkin, p321). His was the vision behind the successful development of the PDP-11, the VAX line of computers, and DEC's leadership in networking. He left the company for a second time in 1983 but maintained a consulting relationship.

The PDP Era

Several authors present good, short summaries of the PDP era (Baron, Chandler, Ferguson and Morris). Here is the Ferguson and Morris synopsis (p.102):

> *" DEC's PDP line of computers were low-cost, high-performance machines targeted at the academic and sophisticated industrial market – users who didn't need or want to pay for extensive soft-ware and support services that came bundled with IBM products. The PDP-6, introduced in 1964, beat IBM to market with time-*

sharing – a single main computer could support multiple simultaneous users. DEC followed up with a steady stream of improved PDPs; their relatively low cost – about a fifth of the cost of an IBM mainframe – and the time-sharing features made PDPs the almost universal choice for school and university computing. .. Then, in the late 1970s DEC broke with its PDP architecture and introduced its powerful VAX line of minicomputers, which made serious inroads at the low end of IBM's commercial mainframe business."

Elements of the rest of the story include the following highlights. DEC introduced its first mini-computer in 1959. It was named the PDP 1 (PDP stood for Programmed Data Processor). The PDP 5 which was introduced in 1963 was the first of DEC's small general purpose computers. The PDP-6, introduced 1964, enabled DEC to beat IBM in the race to introduce time –sharing. The PDP 8 was introduced in 1965 and was the company's first mass-produced minicomputer. It sold for $18,000 and was so small that it could be used as part of other companies' products. Thirty to fifty percent of the PDP 8s sold were bought by companies which then added their own attachments and sold the resulting products as their own branded equipment (Chandler, p. 104).

In 1964 the IBM System/360 was introduced. It used an 8-bit word (one byte) and, because of IBM's dominance in the industry, multiples of 8 became the industry standard. DEC was selling 12 and 18 bit computers and was suddenly at risk of losing leadership in its segment as competitors adopted the IBM standard. DEC immediately recognized the problem and started work on a 16 bit minicomputer called the PDP-X. But Olsen eventually decided to kill that project. The head of the PDP-X project, Edson de Castro, then left DEC to start a rival company, Data General, in 1968. Data General then beat DEC to the market with a 16 bit minicomputer.By the end of 1969 Data General was threatening to overtake DEC as the minicomputer industry leader.

The subsequent rivalry between Data General and DEC made for an interesting contrast with the two companies contrasting markedly in a number of ways. Here is a peek at the contrast as colorfully described by Bro Uttal in a 1979 issue of *Fortune:*

" It is hard to imagine two companies in the same line of work that take such different views of business than Digital Equipment Corporation and Data General. D.E.C. is the Gentleman Jim of minicomputers. It tends to be more solicitous of its customers than of its own stockholders, and it takes pride in treating employees well. By contrast, Data General is rough and tough… Neither customers nor employees count as much with Data General as its own financial record –and by most measures that record far outclasses D.E.C.'s .. D.E.C. is devoted to stimulating growth by creating and supporting myriad new applications of minicomputer technology…Data General, in contrast, is devoted to efficiency…With a much simpler product line and more

straight-forward organization, Data General has been able to maintain a sharper focus on financial performance…'Data General is usually the last company to come out with a new product. But they design their machines for ungodly manufacturing profits and allow for incredibly tight control over costs…'

Uttal adds two additional contrasts. One is DEC's practice of measuring product line managers "chiefly on how happy they make customers..If a manager has met his financial goals but screwed the customer, he's a loser." The second is, " D.E.C's decision to buck industry practice by paying its salesmen straight salaries without commissions – and without bonuses for exceeding quotas. D.E.C., says one sales manager, wants the salesman to think more about the customer than about his next meal. Salesmen are encouraged to meet both the reasonable and the unreasonable demand of users, and their performance is also measured by customer satisfaction (determined through an annual survey)".

DEC regained its competitiveness when it announced the 16 bit PDP 11 in 1970. The product itself was an important story, "one of the most significant technical products introduced in 1970" according to *Industrial Research* (Rifkin and Harrar, p. 104). What made the PDP 11 so special was its increased memory and processing power, its low price, its ease of use, its elegance and the fact that it was designed to span a range of performance (Rifkin and Harrar, p., 103). "It was a breakthrough machine built on a technology that would far outlive and outperform expectations. The PDP-11's simplicity and elegance quickly made it an industry standard, a model for a generation of computer designers. These engineers felt that DEC taught the world how to build small computers." (Rifkin and Harrar, p.103).

The history of the PDP-11's development is also an important story. (Rifken, p.103). It's a story of the resourceful way in which DEC regrouped after Edson de Castro left DEC and took with him much of DEC's organizational capital with respect to producing a competitive 16-bit computer. Here, in part, is how Rifkin and Harrar tell that story (pp. 100-104):

1. Olsen asked Tom Mazzarese to take charge of DEC's effort to develop a 16-bit mini-computer.
2. Mazzarese concluded that the expertise and commitment to get the job done quickly could not be found in the company. The best engineers working on the PDP-X had left DEC to join de Castro. And, "The product line managers were pushing their own 12-and 18-bit machines into the market place. What, they asked, is the hurry if or products are selling so well?"
3. With Olsen's blessing Mazzarese violated the company policy of promoting from within and recruited an experienced project manager from RCA, Andy Knowles.
4. Knowles joined DEC in December, 1969 as product line manager for the PDP-11. His assignment was to get the product designed, introduced

5. Mazzarese also recruited Gordon Bell to redesign the machine. Bell was a professor at Carnegie-Mellon University at the time. With the help of his graduate students he came up with a design that was, "just good enough to beat Data General."
6. "Knowles marshaled the resources and went at completing the PDP-11 with a zeal that only a fresh newcomer could summon. Mazzarese ran interference with Olsen, keeping his probing eye away from the engineers so they could get the job done."
7. "The PDP-11 scored big… (B)y 1972, DEC was back in control of the minicomputer market from top to bottom."

The reference to running interference with Olsen points to a widely reported aspect of the relationship between Olsen and DEC's managers. (Find a quotation to go here).

The PDP architecture had a long life. The PDP-8 and PDP-11 continued to sell briskly through the 1970s. But by the mid-1970s DEC was en route to embracing a new architecture and strategy and the VAX era could be clearly perceived by insiders.

The VAX Era

In 1977 DEC introduced the VAX 11/780 superminicomputer. The first prototype rolled off the assembly line on October 25, 1977 (Rifkin, p. 175). This computer was as powerful as the IBM 370 at one-fourth the price (Baron). The VAX or Virtual Address Extension represented a new computer architecture and a new vision of the direction in which the computer industry was going and a new strategy whereby DEC could lead the industry in the new direction The new vision, which came from Gordon Bell, was that of networking. The new strategy, which also came from Bell, was to focus on VAXes rather than continue to offer a variety of computer platforms.

Bell had no problem selling Olsen on the VAX architecture. "To the outside world the VAX 11/780 was reestablishing DEC's supremacy in the minicomputer market. Rivals who were making strides against DEC's fleet of aging machines suddenly faced a younger, heavyweight contender, and it had the look of a champion." (Rifkin, p.176).

Bell also found ready philosophical acceptance of his vision of networking. It was the obvious way to challenge IBM. While IBM continued to produce a range of computers that were incompatible, DEC would produce a range of computers that were compatible and could work together in networks.

Bell did, however, have a problem convincing top management, including Olsen, to adopt the new strategy of focusing future marketing and development on VAX

machines. Bell's plans allowed for continued production of existing products for which a significant customer base already existed. But there would be little or no new funds for enhancements of those products and any new machine would have to be a VAX. The VAX strategy involved the risks associated with getting into areas where DEC did not have much experience – manufacturing its own microprocessors, building large disk storage units, and writing software to run on networks (Rifkin). So Olsen let top management debate the pros and cons. The debate over this strategy lasted from September to December of 1978. The board approved the strategy in 1978. Olsen did not play an active role in the debate. But once the decision had been made, he assumed responsibility for getting everyone to endorse it and make it succeed.

The original operating system for the VAX computers was proprietary DEC software. There existed a competing product, UNIX, which was developed by AT&T which gave licenses to universities almost for free. UNIX became popular in the scientific and university communities. DEC responded by offering a VAX line that used UNIX.By the early 1980s almost all university VAXes ran on UNIX rather than VMS.

The so-called VAX strategy produced both positive result and possibly one negative result. One positive result was a surge in revenues, profit and stock price. While IBM's sales and profits stumbled, DEC's financial performance was so impressive that *Computerworld* declared 1986 to be the "Year of DEC." (Rifkin, p.286). Another seemingly positive result was that DEC began to take business away from IBM at the lower end of IBM's offerings. But that success may have been a pyrrhic victory. It caused IBM to get serious about counterattacking. And it caused DEC to decide to launch a serious attempt to wrench much more of the market from IBM.

The VAX strategy worked well for a number of years. But DEC made a strategic error in sticking with it too long. As Chandler puts it (p.226-227):

> *" DEC and NCR were victims of their own misguided strategies. DEC's loss resulted from remaining committed too long to a successful strategy. During the 1980s it perfected its VAX minicomputer product line, which shared a single operating system and had replaced its earlier PDP line. Its commitment to the VAX architecture led DEC to enter the work-station market with its VAX technology, rather than embracing RISC/UNIX technology. Management concentrated on bringing out its VAX9000 as a rival to IBM's major mainframe offerings. The VAX9000 appeared in 1990 just as that market was collapsing… (I)ts income had already plummeted from $1.1 billion in the year 1989 to $74 million in 1990, followed by… losses..."*

Personal Computers and Workstations

In the 1980s DEC failed to achieve leadership in two of the most dynamic segments of the computer industry. In both cases the segments capitalized on a vision that

had been an early strength of DEC. The two segments were personal computers and workstations.

Personal Computers.In the late 1970s DEC faced an opportunity to be a pioneer in the development of personal computers. “The enormous potential of these low-priced machines dazzled DEC’s young engineers. It was a matter of enormous pride to them that DEC be on the leading edge of this new wave. Didn’t DEC, after all, pioneer the concept of interactive computing, the very basis of personal computers? Wouldn’t a desktop machine for the individual be the culmination of Olsen’s dream?” (Rifkin, p.198).

In fact, Olsen did not think so. He doubted the existence of a profitable home market (Baron, p.276; Schein, p. 39); saw DEC’s customer as the professional, commercial and industrial user for whom DEC was already providing everything relevant that the home computer would offer (Baron, p.276). Furthermore, he viewed an effort to enter the new personal or home computer market segment as a violation of the VAX strategy because “the technology to make a VAX-based personal computer did not exist at the time.” (Rifkin, p.199).

Nevertheless, in 1980 Olsen decided to endorse a personal computer project at DEC. This was to be a superior product and was named the Professional.After IBM brought out its personal computer in August of 1981 Olsen decided that DEC should develop a second personal computer that was smaller, cheaper and ran on the same operating system as the IBM personal computer.This machine was named Rainbow. At the same time DEC’s word processing group was developing a personal computer aimed at the word processing market. DEC had tried and failed to succeed in this market segment in the 1970s with a word processing machine based on the PDP-8 technology and named DECmate (Rifkin, p.146). This next attempt was named DECmate II.

DEC introduced the trio of personal computers in May of 1982. Olsen made the introduction himself at a press conference in Boston. That was the high point. None of the machines was ultimately successful. Various reasons have been given for that failure – IBM’s first mover advantage, inadequate software offerings, lack of IBM-PC compatibility for two of the three, insufficient resources provided for marketing; and others. But, as Baron points out, “ (I)t is doubtful if Digital Equipment Corporation, with its high internal expenses, could ever have competed with Apple, Dell, Compaq and other personal computer companies.” (Baron, p. 276).

Workstations. This opportunity emerged in the mid-1980s. Chandler summarizes its emergence as follows (p.148):

> *“ The emergence of the workstation path differed sharply from that of the path of the IBM PC and its clones. Here there was no sudden unanticipated opening of a new market. Instead the story provides another example of the successful application of a new technology, in this case the microprocessor, to an existing segment, that of engineering and scientific computers, much as IBM had used the*

new electronic technology to move from tabulating punched cards to digital computers. The workstation was developed to provide engineers and software developers with powerful graphics and processing capabilities. But it soon came to be used as a 'server' in the networks that were being developed both inside single departments…or institutions as well as across institutions. For these new workstations, the minicomputer companies created their own operating systems based on their own chips. After 1985 they turned to a new chip technology, reduced instruction set computing (RISC) and used variations of UNIX for their operating software."

Chandler observes that Apollo and Sun Microsystems were the first movers in this new market segment and that IBM, Hewlett –Packard and DEC were followers. But of the followers, DEC was the slowest. On the surface that claim seems questionable. Sun produced its first workstations in 1984 and DEC came out with a workstation the same year. However, DEC's workstation was based on its VAX technology. DEC did not produce a RISC/UNIX workstation until 1988. By then the competition had established an insurmountable lead (Chandler, pp. 151-152).

The Technology of the 1990s

As DEC entered the 1990s technology was dramatically reshaping the computer industry. New opportunities were there for those with the right strategy and business model. DEC seemed to be in a position to seize one or more of those opportunities. For example, in the words of Gordon Bell (Bell, 2003, pp. 293, 301):

" Internet products were perfect for DEC – it had all the pieces including servers, software, and networking. However, DEC didn't understand how to organize to engage in a new market…"

" DEC led all computer companies in the transition from other technologies to custom CMOS microprocessors, where the company maintained a lead (including over Intel) extending beyond 2003! In a similar vein, DEC's pre-PC terminal business included introducing one of the first laser printers – a business that HP ultimately claimed and that sustained profits well into the early 2000s. With the introduction of the Ethernet, a communications products and services division could have exploited Digital's lead in distributed computing. DEC could have exploited its position with UNIX, as HP did in parallel with VMS instead of being ambivalent and somewhat hostile."

Ferguson and Morris put DEC's strategic failure in yet a different perspective. They suggest that DEC made a common mistake by thinking that it's VAX technology had locked in enough customers and potential business that DEC should stay with that line for a time and reap the profits from the "lock-in." In their words (p. 165-166):

> *"The happy result of lock-in is that the successful player can finally begin to harvest the fruit of its long term efforts… A fatal mistake is to shift to a harvest mode when it is time for a major architectural break. DEC is the clearest example. Its VMS/VAX minicomputer standard was superb but vulnerable to attack from RISC-UNIX machines moving up from the low end. Instead of attacking its own franchise with its outstanding RISC-UNIX technology, DEC chose to sit tight with its current technology, counting on continued profits from its strong established p position, with disastrous results. When a company has a large installed base, as DEC did, continued earnings from service and support can mask a sudden loss of market leadership. The turndown at DEC appeared to hit very quickly, but the rot started years before. It is also clear that the IBM mainframe division has been content for much too long with its extraordinarily successful, but now superannuated, 370 architecture."*

The Management and Culture Story

When Olsen founded DEC he had both a technological vision and a management culture vision. The technological vision was the introduction of interactive computing and the creation of the mini-computer market segment. Included in this vision was a clear idea of who the customers were (scientists and engineers) and how to market to them (salaried sales persons who were also engineers and who created customer awareness of what DEC had to offer).

Edgar Schein is certainly one of the best qualified individuals to explain DEC's culture. Schein was consultant to DEC for most of Olsen's tenure; Schein's academic specialty as a business school professor at MIT gives him the specialized tools needed for the job; and Schein has reported his findings in arguably the best publication on the subject through 2006. Schein's summary of DEC's culture is (pp. 81-82):

a. Six features (or, in his words, genes) made working at DEC a "magical" experience. The six were:
    - "Innovation: We can and will revolutionize computing".
    - "Rugged individualism: The individual is ultimately the source of original ideas."
    - "Truth through conflict: No one individual is smart enough to evaluate his or her own ideas; therefore, to arrive at validity or truth, one must debate

ideas to see which one can survive critical debate or empirical test where that is possible."
- "Personal responsibility: Individuals are not only capable of taking responsibility and doing the right thing but must do so at all times"
- "Family paternalism: Once in the family, one cannot be ejected; failure is the result of a mismatch between person and job and is not the fault of the person; hence, every member of the'family' can feel secure in his or her membership."

b. Six additional features (or genes) helped make DEC successful in its first thirty-five years of existence. Those six were:
   - "Engineering arrogance: A good product will sell itself, and the initial judgment of what is a good product can be made by the designer himself or herself."
   - "Moral commitment to customers: The ultimate role of business is to identify and solve the customer's problem and to deal with customers in a completely open and honest way."
   - "The market as arbiter: The best way to determine priorities is to let products compete with one another internally and let the market decide which products and services should survive."
   - "Organizational idealism: Individuals of goodwill can and will work together to successfully coordinate their activities in the interests of the company."
   - "General control: No matter how much freedom employees and managers had, Ken Olsen always kept some degree of central control, and the organization always maintained some respect for the founder- father figure, which gave Olsen a degree of power and influence even when things were going out of control."

Schein seems confident in stating that this culture truly permeated the entire organization. His confidence stems in part from a series of surveys with employees that Olsen asked him to design and conduct. The surveys were taken in 1966-67. Engineers were surveyed first. Then other areas such as manufacturing and sales were surveyed. Olsen's expressed purpose in having the interviews done was to motivate employees to look point out problems and look for better ways of doing things. So Olsen instructed Schein to not show the results to Olsen. Instead employees were told to try to solve the problems and implement the improvements on their own. Only if the desired changes required top management action should the problem or opportunity be called to Olsen's attention.

The results of the surveys confirmed the cultural traits listed by Schein. With respect to Olsen, Schein found (pp.121-122):

> "*Everyone respected Ken's overall ability, business judgment, and general leadership. He was seen as absolutely indispensable to the company, and most people respected his technical ability, but there*

were differences of opinion about which areas Ken really understood… Ken's emotional outbursts and criticisms of his subordinates in front of others created some resentment, but most people felt that he was an excellent judge of people's abilities and built his organization around what certain people could or could not do. It was recognized that he was exceedingly ethical, moral, and concerned about his people and was always trying to do his best for them, often to the point of doing too much"

Olsen envisioned a culture of individual empowerment. That applied particularly to engineers, of course, for DEC was an engineers' company. But employees in all positions were encouraged to think of themselves as entrepreneurs and admonished to always "do the right thing."

Once the company became large enough to have sizeable product lines Olsen began tinkering with the organizational structure. As once described by Schein, who had an inside view (p. 51):

"*The company was organized primarily by several product lines and by several centralized functions such as sales, service, finance and manufacturing, but there was a sense of perpetual reorganization and a constant search for a structure that would 'work better.' The central functions were services to be 'bought' by the product lines, and engineering was in perpetual flux. This created what many have called one of the first versions of a* **matrix** *, but this term was rejected and structure was viewed as something to tinker with until one got it right."*

The story of how the matrix approach came into being is colorfully told by Rifkin and Harrar. Here is an excerpt from their version of the story (pp. 56-57):

" After lying awake one night struggling with the issue, Olsen hit upon his own version of the concept that would change DEC dramatically and fuel its stunning growth. The idea was deceptively simple: a senior executive would take ownership of each product line. The manager would have to develop it, market it, nurture it, and turn a profit…He would essentially become an entrepreneur within Digital.".

" The product-line manager would stand before the Works Committee with his plan and budget. If they were accepted, he assumed the obligation for carrying them out…"

" Divisional structures, such as at Hewlett-Packard, built iron fences between divisions. Olsen's product-line arrangement

purposely avoided barriers between groups. DEC built bridges among product and functional managers. Line managers would share such resources as sales, manufacturing, and marketing, negotiating to buy these services from the central functions…

" Olsen declared to his managers, ' Now we're a new company. Nobody tells anybody else what to do. Each of you has the responsibility for your part of the company. You, you, you and you are now entrepreneurs and everybody else is a service."

The new management approach was instituted in 1965. There were four product lines - The PDP-5, the modules business, the memory test products and the PDP-6.

Co-founder Harlan Anderson was put in charge of the PDP-6 product line. When that line failed, Anderson decided to leave DEC (1966). It was not a pleasant departure for either Anderson or Olsen and, perhaps for that reason Olsen formed an Operations Committee in 1966. The original committee consisted of 3 product line managers, the sales manager, the manufacturing manager, the financial manager and Olsen (Rifkin, p.63). This committee then became the place where issues were discussed and decisions made when the matter could not be handled by the product line or functional area manager.

One other way in which Olsen "democratized" DEC was his policy of giving engineers a career path option. As Schien explains (p. 51):

"*DEC was one of the few companies at that time that had a clearly defined dual career ladder. The ladder was supported by strong statements from Olsen that it was all right to try to be a manager and, even more important, all right to return to the technical ladder if the management job did not work out. The strong engineering bias made the technical ladder work successfully in the sense that people valued remaining on, or returning to the technical ladder. Engineers could rise to the high rank of consulting engineer and be well compensated at that rank."*

Schien, it will be recalled, was hired as a consultant by Olsen in 1966 and remained in that position into 1992 when Olsen resigned. Schien later conducted a post mortem of the Olsen years and published his findings in 2003 (Schien, 2003). In that post mortem he had this to say about the DEC culture created by Olsen (pp. 1-2):

"*That culture was an almost pure model of what we can think of as a 'culture of innovation.' It created the minicomputer revolution and laid the groundwork for the interactive computing that today is taken for granted. The managerial values and processes that were at the heart of that culture produced an almost uniformly positive response in DEC employees throughout*

its history."

"The DEC culture emphasized – to an extraordinary degree- creativity, freedom, responsibility, openness, commitment to truth, and having fun. Not only were these values central in its early formative years but even when it was an organization of 100,000 people and over $ 10 billion in sales, these values held firm. DEC's management model empowered people who worked there, and most of the employees internalized these values and expressed them in their careers with other companies."

Schien went on to argue (p. 3-4):

"*One of the key values in the DEC culture was 'Do the right thing.' In emphasizing 'Doing the right thing,' the DEC culture created a unique climate that stimulated leadership at all levels … In DEC 'Do the right thing' was a license to both insubordination and to leadership. As we shall see, DEC, more than any other company of its size and scale that I am aware of, created leaders at every level of its organization. And as we will also see, a culture built around leaders creates its own turmoil and difficulties."*

"The DEC story is about leadership not only in technical innovation but also in management practice, manufacturing, community relations, affirmative action, sales and service practices, and perhaps most important, human development. Ken Olsen, DEC's founder, articulated values that are frequently touted as being the essence of what a good organization should be, and it maintained those values for thirty-five years. Those same values created in the end an economic problem that led to disaster for the company."

The culture of empowerment was very attractive to employees in general and talented engineers in particular. But it did generate arguments and conflicts.When communicating with top level executives, Olsen was perceived as living up to his ethical commitment to "do the right thing." But the other executives also experienced occasional outbursts of anger as noted above.

Occasional anger and omnipresent confrontation were particularly evident at high level committee meetings. Again, we turn to the inside view from Edgar Schein (pp. 50-51):

"Ken was obviously the boss, but his behavior implied that he did not take his position of power all that seriously. Group members argued as much with him as with one another and even interrupted him from

time to time. His status did show up, however, in the occasional 'lectures' he delivered to the group when he felt that members were not understanding something or were wrong about something …"

" I was made quite nervous by the level of confrontation I observed … I learned from further observation that this style of running meetings was typical ."

Following the adoption of the VAX strategy, Olsen became convinced that the matrix system had outlived its usefulness. And so he threw himself into an effort to change the organizational structure while maintaining the core competencies of the DEC culture. Here is how *Fortune* described that effort in an article where Olsen was named "America's most successful entrepreneur" (October 27, 1986 pp.30-31):

"*The new (VAX) plan was risky. To succeed, DEC had to master exotic engineering disciplines in which it had little experience… To win customers DEC would have to mount a massive corporate selling effort, much like IBM's. Olsen decided that DEC's opportunistic, scatter-shot style of product development and marketing was ill-equipped to handle the situation.…Olsen set out to transform DEC into a unified marketing organization that would be worthy of the new products. Olsen reshaped DEC by teasing, goading, and teaching employees, by sermonizing – and by remorsely pillorying those who stood in his way.*

In 1983 DEC's operating committee formally voted to shift profit and loss responsibility away from the product managers.Again, *Fortune* provides a succinct summary of what followed (October 27, 1986, p. 31):

"*The move, which should have been a triumph for Olsen, at first seemed a catastrophe. Accounting snafus triggered an embarrassing 72% plunge in earnings in a quarter the company predicted would hold steady …A year later, however, DEC's new VAXes began rolling out. The computers leapfrogged the competition."*

The Community Development Story

Olsen had a strong sense of social responsibility. This was reflected in a number of ways ranging from affirmative action programs to the placing of factories in blighted or low income areas. Here's a peek at this aspect of the story as retold by Schein (pp. 259-260):

" Ken's management philosophy stimulated innovations in affirmative action, education and community development.…Managers …responded not only by developing specific programs to hire talented minorities but also by building

factories in.. neighborhoods that were almost exclusively African American…Support groups of all kinds were encouraged for women employees and for gays and lesbians, thus sending a strong message that no form of discrimination would be tolerated… closely connected to the emphasis on affirmative action was a support for education. Through the efforts of Ken Olsen's wife and the Olsen Foundation…a junior college technical program, the first of its kind, was established for computer technologists. This program linked forty-two junior colleges, which were asked to recruit minorities and females to make up at least 50 percent of their classes."

Olsen's Resignation and the Demise of DEC

Between 1987 and 1992 DEC stumbled. The computer industry was changed in ways that put the company at risk and DEC failed to make the required changes. In 1991 DEC suffered its first loss, followed by losses in 1992 and 1993. Olsen resigned in late 1992. The business press said Olsen had been "deposed" as DEC's president (Bulkeley). The head of the semiconductor division, Robert Palmer, was named CEO. The company showed a small loss in 1993 and a large loss in 1994. DEC returned to profitability 1995 largely due to massive downsizing. The workforce was reduced from 110,000 employees to close to 61,000; 25 manufacturing plants were sold, leaving DEC with 10; and 140 business units were reduced to 3 (USNWR, DEC. 18,1995). In 1998 DEC was purchased by Compaq Computer .Then, in 2002 Compaq and Hewlett-Packard merged. While DEC as a company had disappeared, it can be argued that the seeds of the DEC culture lived on, first at Compaq and then at Hewlett-Packard.

CONCLUSION

Gordon Bell was one of several ex-DEC leaders to respond when Edgar Schein asked DEC alums to share their opinions regarding DEC's demise. Bell was quite critical of Olsen. He claimed that Olsen had been a superior CEO in the beginning but had lost touch with the market and his own principals by the 1980s.

While Bell criticized Olsen for his leadership in the 1980s, he also expressed the view that DEC was in a position to make a recovery when Olsen was replaced by Palmer. So, in Bell's view Palmer and his board of directors bear the ultimate responsibility for DEC's demise.

Bob Baron, a company outsider but industry insider, also raises this possibility when he says, "One wonders what might have happened if Olsen and his successors had been given a chance to continue their innovation." And then Baron adds, "Companies are measured by the service they provide to customers, growth in employment, and return to shareholders. For thirty-five years, under the leadership of Ken Olsen, Digital Equipment

had been a success. Since its acquisition by Compaq and the Compaq's acquisition by Hewlett-Packard, the company has been a failure in all three areas." (Baron, p.284).

As far as Edgar Schein is concerned focusing on DEC's demise misses the larger point. After extensive interviews with ex-DEC employees, he tells us that (Schein, p 256).

> "*Not only are people nostalgic about their days at DEC, but they carry forward the model of management, particularly,' Do the right thing,' that Ken Olsen created as a model to be emulated and reproduced wherever they go. I believe that the essence of this model is that Olsen treated people as responsible adults, something that most organizations fail to do. Giving people freedom and responsibility* and meaning it if the abuse it *is the critical ingredient. "*

And then Schein adds (p.268),:

> *" DEC lives on – in the (very positive) lives and memories of its alumni , in its customers who still use its equipment, and in organization and management theory – as one of the prime examples of what is possible in the human and technical arena. Many people we have talked to feel that DEC was a company ahead of its time in how it organized.*

Perhaps a final quotation from Rifkin and Harrar is appropriate since they both covered the computer industry as reporters and conducted extensivc interviews for their 1989 book on Olsen. Here's a final word from them (pp.4-5):

> *" Olsen describes himself as the Christian and the scientist, searching for truth and humility in both his personal and business lives. He manages to be simultaneously flexible and unwavering – flexible in the smaller areas of decision-making, unwavering in setting direction, policy and tradition. He is the democrat who has given up great personal control of his sprawling organization of 12,000 employees. But he is also the autocrat who has maintained his power as the final word and has never named a clear second-in-command…The picture of the man is painted from stories here, observations there…Consensus comes on a list of adjectives: he is honest, decent, religious, paternal, stubborn, intuitive, commanding, charismatic."*

Finally, here is one last assessment from the MIT professor who worked closely with Olsen for most of DEC's history, Edgar Schein (pp.3-4):

> "*Ken Olsen …articulated values that are frequently touted as being*

the essence of what a good organization should be, and .maintained those values for thirty-five years. Those values created in the end an economic problem that led to disaster for the company. But the DEC story leaves us with two huge questions. Would it have been possible to save the economic entity without giving up those values, that is without destroying the culture? And, in the end, what is more valuable – the culture or the company?"

" Fundamental questions also arise as to whether DEC's ultimate Contribution was to technology or to management practice …Was it Ken Olsen's technical vision that created DEC's successes, or was it his organizational genius that fostered what came to be known as a world-class engineering organization under the leadership of Gordon Bell?"

References

Baron, Robert C. *Pioneers and Plodders: The American Entrepreneurial Spirit.* Golden, Colorado: Fulcrum Publishing, 2004.

Bell, Gordon, "What Happened? A Postscript," in Edgar Schein, *Dec Is Dead, Long Live DEC," 2003, pp. 292-301*

Bulkeley, William M., "Digital Reports First Net Loss In Its History, "*The Wall Street Journal,* July 26, 1990, p.A4.

Chandler, Alfred D. *Inventing the Electronic Century: The Epic Story of the Consumer Electronics and Computer Industries.* Cambridge, MA: Harvard University Press, 2005.
"Digital Equip," *Value Line,* May 14, 1982 and November 4, 1988.

"Digital Equip," *Value Line Investment Survey*, May 14, 1982 and November 4, 1988.

Ferguson, Charles H. and Charles R. Morris. *Computer Wars: How the West Can Win in a Post-IBM World.* New York: Times Books, 1993.

Petre, Peter, "America's Most Successful Entrepreneur," *Fortune,* October 27, 1986, pp. 24-32.

Rifkin, Glenn and George Harrar. *The Ultimate Entrepreneur: The Story of Ken Olsen and Digital Equipment Corporation.* Rocklin, CA: Prima Publishing and Communications, 1990.

Schein, Edgar. *DEC is Dead, Long Live DEC.* San Francisco: Berrett-Koehler, 2003

Simons, John, "How DEC has picked itself up off the deck," *U.S. News and World Report,* December 18,1995, p. 57.

Uttal,Bro, " The Gentlemen and the Upstarts Meet in a Great Mini Battle, " *Fortune*, August 23, 1979, pp.98-108.

Wilke, John R., "Digital Offers Severance Plan To 700 Workers," *The Wall Street Journal,* September 14, 1989, p. A4.

Wilke, John R., " Digital Registers a Loss of 1.85 Billion, But Quarter's Revenue Cheers Analysts, " *The Wall Street Journal*, July 24, 1992, p.A3