DEC Is Dead, Long Live DEC

Lessons on Innovation, Technology, and the Business Gene

The Lasting Legacy of Digital Equipment Corporation

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Preface

My collaborating authors and I have, from the very beginning of this project, struggled with the question of who is our audience and who might benefit from the lessons that one can glean from such a story of one company. We have identified many possible audiences—founders and entrepreneurs; investors; executives who are trying to change their companies to become more innovative, or perhaps more efficient and less innovative; management theorists interested in the growth, evolution, and death of an organization; organizational consultants; students going into business and wondering what sort of a world they might be entering; professors interested in teaching about leadership, organizational culture, and technology; and, of course, Digital Equipment Corportion (DEC) alumni, many of whom are still wondering what happened and why.

My own answer to the question of audience is that we are writing to the *thinking* and *reflective* person in all of the above categories. Too many of our business books just focus on what to do. They make glib assumptions about a situation that an organization might face and propose a few action steps to solve the problem. The DEC story should make you think and reflect and make you aware of the tough choices

and trade-offs that have to be made in the real world all the time. The DEC story illustrates that every company's evolution is unique but that certain kinds of events are universal because they derive from the inevitable consequences of success, growth, and age. What DEC should have done, what another company in the same situation should or might have done, what you should do in your unique organizational situation requires some deep thought and insight into the dynamics of organizational evolution.

As I hope the reader will see, the implementation of even the simplest prescriptions like "Have a strategy," something all management books agree on, becomes quite complex in the context of a particular company, with a particular history, and with particular personalities that create a certain kind of culture.

My contributing authors and I have had many arguments about what are the "lessons" to be learned from the DEC story about governance, leadership, entrepreneurship, technology, innovation, strategy, marketing and, perhaps most important, organizational culture. What makes the DEC story both so interesting and so complicated is that there are lessons to be learned about all of these things, but they don't fall out nicely into ten principles, or five things to avoid, or seven steps to business success.

One of our interviewees who spent most of his career within DEC kept reminding me that "DEC was a coat of many colors, so don't try to write a simple one-dimensional history of it. It won't work." He was, of course, correct, and we found this out the hard way in our own discussions of how to write this book because each of us saw DEC from our own perspective, drew our own lessons, and our his own biases in how the story should be told. We tried to integrate these points of view, but just as DEC failed at many levels to integrate the agendas of its various subgroups, so we also failed in this task and have, therefore, a story that is itself also a coat of many colors.

This preface is written in the first person because I felt that ultimately my outsider perspective and my interest in organizational culture and leadership added a dimension to the analysis that is missing in most books about organizations and management. I have tried to

learn from my supporting authors and have encouraged them to write their own views to be included wherever possible, but in the end I tried to write what seemed to me to be the aspects of the story that are typically not told by insiders, either because they are not of interest to them or because, by being insiders, they cannot see their own culture sufficiently clearly to understand its power and ubiquitousness.

So we have here a book about culture and leadership, a book about technology, innovation, organizational success, and failure. The DEC story is to me a story of how technology, organizational growth, and business functions such as strategy, marketing, and finance not only interact with one another but are deeply colored by the cultural forces that are at play in the organization. To grasp this *interplay* requires something from the reader—some thought and reflection. The lessons are there for all the audiences mentioned above, and we try to bring them out as clearly as possible, but none of these lessons are simple because, in the end, real organizations founded and run by real people are not simple. This book is an attempt to pay tribute to those real people who were solving difficult real problems and to identify how their efforts left an important legacy.

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Purpose and Overview

The story of Digital Equipment Corporation (DEC) is fundamentally a forty-year saga encompassing the creation of a new technology, the building of a company that became the number two computer company in the United States with $14 billion in sales at its peak, the decline and ultimate sale of that company to the Compaq Corporation in 1998, and the preservation in its many alumni of the values that were the essence of the culture of that company. (The company's official name was Digital Equipment Corporation, and its logo was "D.I.G.I.T.A.L." or "Digital," but common usage around the company was typically "DEC," so we will adopt that usage throughout this book.) 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 the people who worked there, and most of the employees internalized these values and expressed them in their careers with other companies.

In choosing the title of this book, we thought about the British Empire, which disappeared as a major political entity yet instilled its values in the former colonies that eventually became stronger than the parent. DEC disappeared as a company, yet former DEC engineers and managers populated the computer industry and became major contributors to other companies. The DEC culture lived on in the "colonies" that it spawned or helped to develop.

WHAT IS TO BE LEARNED FROM THE DEC STORY?

The lessons to be learned from this story are many. In our effort to learn from it, we will be asking the following questions:

1. How is a culture of product innovation created, and how does it evolve?
2. What are the essential ingredients of such a culture in terms of the managerial values and practices it displays?
3. What contributions did DEC make to the growing technology of computing and to management practices?
4. How did the "genetic structure," the DNA of such a culture, produce extraordinary results without containing what can be thought of as a pure commercial or "money gene"?
5. How were the traditional business functions handled in such a culture of innovation?
6. How did success, growth, and age create particular organizational problems that had to be managed?
7. How did technical progress create changes in competition and in the marketplace that required cultural evolution?
8. How was that cultural evolution inhibited by the very success that the organization experienced?

9. How is it that essential elements of a culture survived, while DEC, the economic entity, disappeared?

Why is it important to learn more about these nine issues? Primarily because every organization as it matures goes through developmental stages that require the making of choices, and these choices often involve difficult trade-offs between conflicting values. Yet these choices determine the future of the organization. The DEC story is a unique opportunity to study in some detail how the choices made at various developmental stages had both desirable and undesirable consequences. Entrepreneurs, investors, consultants, managers, and organization theorists can all benefit from seeing how complex these choices can become when one looks at one organization in detail and over a long period of time.

WHY IS DEC AN ORGANIZATION WORTH STUDYING?

DEC as a Classic Case of Entrepreneurial Leadership

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. The DEC story is therefore also a story about the triumph and, in the end, the "tragedy" of technical, organizational, and social leadership. Warren Bennis, the eminent researcher of leadership, has pointed out that the difference between leadership and management is that managers "do things right," while leaders "do the right thing." In DEC "Do the right thing" was a license both to insubordination and to leadership. As we will 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. 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. Did the technological vision dictate a certain management style, or did a certain management style enable extraordinary technical achievements? 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? Was it the culture that Olsen created that attracted talents like Gordon Bell and made possible the building of an organization in which world-class engineers wanted to work? Or was DEC's success the product of the interaction of Ken Olsen's and Gordon Bell's visions and management practices?

A Classic Example of Organizational Culture Dynamics

Why focus on culture? Culture creation and culture change are a constant source of preoccupation these days for entrepreneurs and executives. Hardly a day goes by without seeing a newspaper story or a book announcement about an executive who is "changing the culture" or "creating a new culture" in his or her company, usually to stimulate innovation in a rapidly changing technical environment. We see calls for "service cultures," "cultures of empowerment," "teamwork cultures," "cultures of openness," "trust cultures," and, most recently and emphatically, "cultures of innovation." Everyone seems to want to know how to create innovation, especially in older companies that seem to have lost their innovative edge. And it is increasingly recognized that culture creation and culture management are the essence of leadership.

One of the main preoccupations of entrepreneurs and company founders is how to "create the right culture" or "preserve the culture that

they have created." Yet little is known about creating or preserving a culture. Leaders in more mature companies seem to believe that announcing a culture of innovation from a position of influence is sufficient to make it happen or that they can "change" culture to fit the new requirements of the market. Few of these executives question whether cultures of innovation formed around products, processes, or management systems would actually solve the particular business problems that they are encountering. Few of them question whether certain cultures should be retained even if they produce economic difficulties.

We don't have a coherent theory or set of concepts for culture "process." We don't understand well enough how culture works—how it is created; how it evolves; how it changes; and how it influences strategy, structure, and business processes. It is precisely this absence of knowledge that makes executives nervous about culture as a concept. Culture appears to be something that is difficult to control; hence, it is often avoided when strategy and process are discussed. Yet as we will see, in a mature organization culture pervades everything, even the most fundamental economic decisions that the board and senior executives make. A better understanding of cultural dynamics in relationship to technology and organizational evolution is therefore not a choice; it is a necessity.

One can write about how culture and leadership work in the abstract, providing case illustrations as one goes. I have done this in two of my previous books, *Organizational Culture and Leadership* (1992) and *The Corporate Culture Survival Guide* (1999). What remains to be done is to look at one or more of these cases in greater depth to appreciate the subtle dynamic processes that are at work in organizational cultures and to show how these processes explain the rise and fall of organizations, particularly ones that seemed to be on the road to success yet could not sustain themselves. And it is especially important to understand better the role of leadership in the creation, maintenance, evolution, and ultimately destruction of a given organizational culture.

One of the most dramatic of these cases is DEC, an organization my contributing authors and I came to know intimately as consultants

or employees or both from 1966 to 1992. DEC virtually transformed the computing landscape and rose to be the number two computer maker with a $14 billion sales volume in 1992, which put it in the top fifty corporations in the United States. Ed Roberts in his seminal book on high tech entrepreneurs calls DEC "the most successful MIT [Massachusetts Institute of Technology] spin-off company" (Roberts 1991, p. 12). Ken Olsen was called by *Fortune* magazine in 1986 "arguably the most successful entrepreneur in the history of American business." DEC's economic rise was accompanied by a myriad of contributions to technology, to management theory and practice, to production processes, to the utilization of women and minorities in industry, and to community relations. Common to all of these contributions was a set of cultural dynamics that made extraordinary things possible. What can these cultural dynamics teach us?

Culture works its influences in many ways. First of all, DEC was created at a time in U.S. society when social values were moving toward more individualism and where technology was facilitating this trend. Not only was Ken Olsen, the key architect of the company, brought up at a time when certain postwar values were salient, but the whole design thrust of DEC's products toward distributed interactive computing reflected decentralization, rejection of formal authority, empowerment of the individual, and, at the same time, the networking of individuals for greater efficiency. Peter DeLisi, coming from IBM, noted immediately that the IBM mainframe was symbolic of authority and centralization, while DEC's time-shared and networked computers were symbolic of individualism and freedom (DeLisi 1998). In other words, product design does not occur in a vacuum; it reflects social trends and social issues. When DEC appeared on the scene, social norms supported and stimulated the kinds of products that were designed.

DEC as One of the First Dot-Coms: A Knowledge Company before Its Time

As the world gets more complex, organizations are more than ever dependent on knowledge workers and knowledge management. Many observers and analysts of DEC saw it as one of the first and most vivid

examples of a knowledge-based company with a culture in which knowledge creation and management were highly valued and in which networking and open exchange of knowledge was a central management principle. (Debra Rogers Amidon noted this in a 1991 management memo that is reproduced in appendix C. Two of the first books on networking as a business organization concept were published by DEC employees Jessica Lipnack and Jeffrey Stamps [1993, 1994]. Debra Amidon has also published two books on the "knowledge economy," based on insights first gained at DEC [Amidon 1997, 2003]). Several alumni have pointed out that because of DEC's early use of networking, it was one of the first companies ever to be assigned a "dot-com" address by the U.S. government. As we will see, there are many lessons to be learned from DEC, both about how one creates an effective knowledge-based company and what managerial dilemmas and dysfunctions can arise in such an organization as it gets larger and more differentiated. Even though DEC failed as a business, the management systems and principles it instituted around networks and knowledge management are seen by many as a blueprint for how future organizations will have to be designed and managed. In particular there are lessons for decision-making theory. Knowledge workers operate from different premises when they have to reach consensus in a network in the absence of hierarchical authority.

DEC as a Classic Case of Values-Based Management

Much is written these days about values-based management and the need for management to clearly articulate its values. DEC is a classic case of an organization that was built on its founder's very clear set of values. Ken Olsen's values were written down, articulated throughout DEC's history, used explicitly in the training and socialization of new employees, restated explicitly in company documents of all sorts, and adhered to with a passion right to the end. In most organizations there is a disconnect between articulated values and actual management practices. In DEC, to a surprising degree, the values were reflected in actual work practices and became thoroughly embedded in the culture. Many DEC values had a strong moral imperative, which gave

them stability and which makes it possible to see both the strengths and weaknesses of this degree of values-based management.

DEC created what would, by any definition, be thought of as a strong corporate culture. The basic question then is to what extent such a culture can evolve as technology and organizational requirements change. An even more fundamental question is whether such highly valued managerial practices should evolve and change. Should values change to support organizations, or are organizations an expression of human values? And if they cannot sustain those values, should organizations die?

DEC as a Classic Case of Technological Evolution to Commodification

The DEC story illustrates clearly the difficult challenge of modifying an organization to adapt to changing market conditions as its own technological innovations create new markets. Especially difficult is the move from a culture of innovation, based on one set of managerial values, to an organization geared to producing commodity products that typically require a different set of managerial values and practices. As Paul Kampas's analysis in chapter 9 shows, the failure of DEC's culture of innovation to coevolve with changing market conditions lead to inefficiencies and ultimately to economic failure. The very success of the early innovation created competitive forces that changed the nature of the innovation, stimulated disruptive technologies and market demands, and therefore created a need for organizational transformation. That transformation may have been beyond the organization's ability or will to manage, even if the leadership recognized the need. Could DEC have survived? We will see that the answer to this question is fraught with complexity and lessons for both young and mature organizations.

Was DEC a Case of Strategic Myopia or a Case of Deliberately Diffuse Vision?

In its early years DEC had a clear technical vision built around high-quality, new, and innovative products. The market supported this vi-

sion and started DEC on a thirty-five-year path of financial success. Eventually, though, the market evolved, and DEC found itself in strategic turmoil. Some argued that DEC needed to focus and stop trying to do everything, while others argued that DEC's ability to continue to produce powerful innovative products across the board was precisely its strength and that therefore it had to continue to support a wide range of innovations.

DeLisi feels that this issue was complicated by the lack of a strategic process that would resolve the dilemma and enable the company to set priorities, as he points out in appendix D. Olsen and other senior executives always believed that DEC had a strategy, but, according to DeLisi, they did not in fact understand what business strategy really is, how one forges it, or why it is needed more and more as the organization grows and matures. Most managers use the concept of *strategy* glibly without considering how one actually formulates strategy and what functions it must perform for an organization at different stages of growth. And then the question arises: what is "strategy" in a peer-to-peer network such as DEC attempted to maintain, even on a large scale?

DEC as an Illustration of Classic Problems of Entrepreneurial Succession, Governance, and the Role of the Board

The recent rise and fall of dot-coms highlights the problem of how investors and entrepreneurs can and should relate to one another. How long should an entrepreneur be in control of his or her company? When is an optimal time to go public and, if successful, how should the founder relate to an outside board of directors? When should a founder be replaced by professional management? What are the problems of governance at the different stages of an organization's evolution? How do technological changes create new dilemmas of governance?

The DEC story bears directly on these questions, especially on the role that the initial investor plays in controlling who is on the board even after the company has gone public and the role that the founder plays in selecting board members. As we will see, the relationship between General Georges Doriot in the venture capitalist role, the board mem-

bers he selected, and Ken Olsen as founder and chief executive officer (CEO) created a complex "governance system" that had both strengths and weaknesses. The DEC story raises questions about how a board can and should evaluate the ability of the founder to manage a growing and mature business, when and how succession problems should be raised, and what kind of manager should succeed a founder. In the late 1980s and early 1990s DEC faltered financially, which raised these very issues. There is much to be learned from how the scenario played out and how Ken Olsen's successor in 1992, Robert Palmer, managed in the years until DEC was bought by the Compaq Computer Corporation in 1998.

DEC'S FATE: THE RESULT OF ROOT CAUSES OR A COMPLEX INTERDEPENDENT FORCE FIELD?

In the managerial world there is a great need to find simple explanations that will enable us to avoid the errors of the past, but simple answers are usually so abstract that they do not really enlighten us. DEC's demise has been explained very simply but not convincingly. One simple explanation is that Ken Olsen in his later years lost his vision, failed to take appropriate action, and stuck to values that were no longer appropriate for the business situation. This explanation turns out to be a gross oversimplification and is, to a considerable degree, incorrect. We will never know what might have happened if Olsen had left ten years earlier, but, as this analysis will show, what happened to DEC in the 1980s and beyond was predictable from events that could be observed already in the 1960s, and much of the difficulty that DEC ran into was endemic to successful growth and differentiation, based on a culture and management system that employees and managers alike really liked, valued, and wanted to preserve at all costs. The culture did not coevolve with the technology and the organization. We need to understand better all the forces that made the culture so strong and the forces that kept it from coevolving, and that takes us well beyond Olsen and his own behavior, as we will see.

Many other so-called root causes have been proposed to explain DEC's sharp decline. "Failing to see market changes," "arrogance,"

"failure to control costs," "lack of strategic direction," and other explanations abound, but the question remains: if any of these diagnoses are correct, why did these failures occur? What underlying cultural dynamics were operating to explain why DEC "missed the PC market opportunity," why DEC "chose to stay with a proprietary system" rather than embracing "open architectures," why DEC in its later years "was not able to achieve a clear sense of strategic direction"?

Paradoxically, even as DEC was declining as an organization, it was creating projects that led to state-of-the-art new products and organizations—AltaVista, the Alpha chip, and the Enterprise Integration Service Organization, to name just three. Ex-DEC executives were increasingly playing key roles in other organizations in the growing computer industry. When these DEC alumni tell you that they learned critical lessons about how to manage during their years at DEC; when they choose to get together in meetings to reminisce about the good old days at DEC; when they use their alumni directory to maintain contact with friends from the DEC years, it says something about the stability of the culture that Ken Olsen and the early leaders of the company fostered. What was so special about this culture?

The lessons to be learned here are about how culture works at different stages in an organization's life cycle. The very same processes can have very different outcomes at different times in the life of an organization. Culture is a complex force field that influences all of an organization's processes. We try to manage culture but, in fact, culture manages us far more than we ever manage it, and this happens largely outside our awareness. The most dangerous error in the analysis of culture is to overlook its tremendous yet invisible coercive qualities and its extraordinary stability. The DEC story provides an opportunity to examine culture as a complex force field and to bring to awareness forces that are often ignored.

THE "DATABASE"

Most of the DEC story will be told from the point of view of participants who worked in the company. I worked as a consultant to Ken

Olsen and the Operations Committee from 1966 to 1992. I spent many weekends with the entire top management of the company at the various Woods Meetings that occurred over the years and was involved in a variety of projects in different groups and functions within DEC. Though Ken Olsen was the primary client, his style made it not only possible but also mandatory to treat the entire organization as a kind of "ultimate client," which resulted in meeting many managers and employees from many functions over the years. As will be noted in various chapters, my experiences within DEC were also instrumental in evolving my own concepts of *organization development* and *process consultation* (Schein 1987, 1988, 1999b).

Peter DeLisi was recruited in 1977 from IBM into the role of a product line manager. He later held positions in sales, sales training, marketing, and as a consultant in Enterprise Services. He left the company in 1993. Paul Kampas's career at DEC spanned engineering, strategic planning, and competitive analysis from 1976 to 1994. Mike Sonduck worked primarily in manufacturing from 1976 to 1981 as an internal organization development consultant.

During 2000 and 2001 we conducted over fifty intensive interviews with senior managers and with key engineers around whom so much of the story evolved. I spent many hours with Ken Olsen in 1999 and 2000 reminiscing about past events and trying to make some sense of them. Olsen strongly supported this project because he felt that the real story of how DEC succeeded and what caused its decline had not been told. Olsen the scientist wanted a more "scholarly" analysis even though he realized that some of that analysis would involve criticism of him and some of his decisions. He wrote many memos articulating his managerial philosophy, and these will be liberally quoted throughout the text.

In June 2001 the Computer Museum of Menlo Park, California, sponsored DECworld 2001, a two-day conference attended by two hundred DEC alumni, including many of its former senior managers and engineers. The reminiscences, formal talks, and informal conversations provided valuable input to me in thinking through this project. Perhaps most remarkable of all was the high attendance and the

great enthusiasm of the group in looking back over what they regarded as positive experiences.

Key executives such as Gordon Bell, Barry Folsom, Bob Glorioso, Win Hindle, Jeff Kalb, Peter Kaufmann, Andy Knowles, Ed Kramer, Grant Saviers, John Sims, and Jack Smith provided invaluable information. Consulting engineers, those who held DEC's top technical rank, such as Dave Cutler, Sam Fuller, Alan Kotok, Jesse Lipcon, Bill Strecker, and Bob Supnick supplied various points of view, reviewed some of the chapters, and helped with examples and incidents that illustrated some of the key points. I also interviewed board members and made material available to them for their comment. Invitations were sent out through the alumni network for ex-DEC people to write to me with their own analyses of why DEC succeeded and why DEC failed. As chapters evolved, these were sent out to various alumni for comment, correction, and elaboration, recognizing that the "coat of many colors" would not be easily captured in a single image. The ability to use e-mail to circulate chapters, get opinions, ask questions, and check conflicting points of view made the writing of this book a DEC-like networking experience in itself.

My contributing authors and I spent many hours debating various aspects of the DEC story in trying to make sense of the many events that occurred over the forty-year history. Peter DeLisi focused on strategy, marketing, and governance issues. Paul Kampas was most concerned with the technological evolution and its impacts. Michael Sonduck lived with the many transformations and innovations that occurred in the manufacturing world and in DEC's growing organization development function. My own concern was primarily with trying to understand the cultural dynamics and how these colored the other issues. Most of the book is presented from my own point of view, but when particular issues were of concern to my contributing authors, I quote them directly or insert their material into the text. We were also fortunate in having Tracy Gibbons, one of the many talented members of DEC's internal organization consulting group and an organization development specialist, volunteer to do a chapter on how the DEC experience influenced the leadership potential of many of its employees.

Other writers have analyzed the DEC story, so we also examined the theories of Roberts (1991), Christensen (1997), Utterback (1994), Rifkin and Harrar (1988), and others who have published their views of why DEC succeeded and failed. We incorporated their theories in our analysis, but the primary sources are our own experiences and our interview data.

Communicating the nuances of how a culture works is difficult. We will rely on a mixture of stories and analysis to bring out both the concrete detail of how things happened and the underlying implications of those events. We will supplement these stories and analyses with quotes from DEC employees and managers as well as with formal written materials from different times in DEC's history.

THE ORGANIZATION OF THE BOOK

The book's structure reflects three organizing principles: (1) chronological history; (2) the three evolutionary streams of technology, organization, and culture; and (3) the multiple points of view of the authors and other ex-DEC managers who made contributions to the manuscript. We have begun with this introductory chapter that lays out our purposes. Chapter 2 describes how to think about the three developmental streams and how to think about the concept of *culture;* it also introduces the metaphor of *cultural DNA* and the *money gene.* In part I we describe how the DEC culture was created. Chapters 3, 4, and 5 analyze aspects of Ken Olsen's beliefs and values. Chapter 6 describes the DEC cultural paradigm in a more formal manner. Chapter 7 by Tracy Gibbons describes the impact of this culture on a sample of DEC alumni, and in chapter 8 I show how DEC's culture impacted me directly and helped me to formulate my own concepts of *process consultation* and *organization development.*

Part II describes some of the events that shaped DEC's midlife and ultimately led to its death as an economic entity. In chapter 9 Paul Kampas analyzes this period from a technological evolution point of view and shows how DEC's fate could be expected as technology changed. Chapter 10 analyzes the organizational evolution that oc-

curred as a result of success, growth, and age. Chapter 11 describes how DEC as a learning organization attempted to deal with the various issues that growth brought with it, and chapter 12 shows how those same issues continued to influence DEC's continued success yet eroded DEC's strength as an economic competitor. Chapter 13 describes how through the 1980s and early 1990s Ken Olsen and others attempted to remedy the deteriorating situation and how that period came to an end in 1992 with Ken Olsen's resignation and Bob Palmer's promotion to CEO.

Part III tackles the question of what it all means. In chapter 14 I examine some of the obvious and not so obvious lessons about innovation, leadership, culture, and social issues. Embedded in these lessons are some observations about DEC's ultimate role and some of its lasting impacts. Chapter 15 summarizes and elaborates on some of the legacies as seen by various alumni and outside observers.

The five appendixes provide details and enhance various parts of the DEC story. Appendix A summarizes for the more technically inclined reader the contributions DEC made to computing and networking technology. In appendix B Michael Sonduck reviews his own experiences as an organization development consultant in the manufacturing organization. In appendix C we reprint a 1991 memo from Debra Rogers Amidon to Ken Olsen showing how DEC was actually one of the first true knowledge-based companies. Appendix D provides an analysis by Peter DeLisi of DEC's strategic failure. The final appendix is entitled "What Happened? A Postcript," by Gordon Bell, who was DEC's primary technical architect. These appendixes sharpen and highlight the lessons and legacies by giving us more concrete data around various issues discussed.

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Three Developmental Streams

A MODEL FOR DECIPHERING THE LESSONS OF THE DEC STORY

As we have seen, DEC was a coat of many colors, and there are many ways the DEC story could be told. In order to bring out the cultural dynamics that are the central part of the story, I will discuss DEC's founding and early history, its rise and peak years, and its decline and death. However, I will not present the story the way a historian would, with many dates and details. Two other books have provided such a historical perspective (Pearson 1992; Rifkin and Harrar 1988). Rather, the emphasis will be on the cultural eras and critical periods that highlight major trends and that enable us to begin to see why those trends were developing.

THREE DEVELOPMENTAL STREAMS

Organizations can be analyzed from three developmental perspectives. Although these perspectives are often treated as independent, they are, in fact, highly interdependent. The analysis of DEC will show how this interdependence works and what can be learned from it. The three developmental streams are

1. The technology stream: the technological environment in which DEC operated and its own contribution through its products to that environment;

2. The organizational development stream: the ways in which an organization working in this technological context begins, grows, evolves, and, in the case of DEC, dies; the structures and processes that result from success, growth, size, and age; and
3. The cultural stream: the founding values that are shared through early and continued business success and eventually become embedded as shared, taken-for-granted assumptions about how an organization should be run.

Technology evolves as a function of inventions, innovations, product developments, and market forces. An individual company such as DEC influences this evolution, but it is only one force among many. The organization's structures and processes evolve as a function of its own success, its growth, its age and maturity, and its geographical, functional, and product diversification. The broader societal culture evolves as social, political, and economic conditions change, and the organizational culture evolves as a function of its leaders and the degree to which shared assumptions enable the organization to solve its problems of survival, growth, and internal integration.

Difficulties arise when these streams do not converge, that is, when the technology, the market, and the organization's capacity to respond to changing technological and market requirements are no longer aligned because the culture did not coevolve with the other streams. Culture is, by definition, a conservative force; hence, failure of cultural evolution is potentially an organization's Achilles heel. What this story will reveal is how that lack of alignment can result from a kind of culture that makes organizational adaptation virtually impossible.

Why should you care about this complex set of developmental dynamics and their interaction? Because the things that can be managed and controlled, the structural components and processes of the organization, are deeply influenced by the technological and cultural forces that are less controllable. If those influences are not understood and taken into account, the organization becomes a passive victim of cultural and technological forces. If they are understood and taken into account, the organization can, to some degree, compensate for and locate those elements that are manageable.

The illusion that organizations can control their own fate stems from the failure to understand how technology and culture limit what is possible. We will see that as DEC pushed into new areas of technology, it had to make major trade-offs between developing innovations that pushed the technological limits and concentrating on commodities that were technically feasible. The cultural constraints entered the picture through the taken-for-granted assumptions and mental models of the founders and early leaders of that organization. Founders, investors, and leaders are not autonomous rational actors. Their own family, educational, and occupational backgrounds influence their values and assumptions. To understand the evolution of a particular company's culture, therefore, requires an understanding of both the personal backgrounds of the founders and leaders and of the technological context in which the organization was created. Organizational dilemmas arise when the external technological environment evolves and the organization grows and ages while the founders continue to operate in terms of the technological and managerial values that they grew up with.

General Doriot, as the initial investor, and Ken Olsen and Harlan Anderson, as DEC's primary founders, were all working in a technological and social environment that made certain things seem more feasible than others and that provided market opportunities that shaped how DEC evolved. Broad social trends and societal needs influenced their thinking. At the same time, Ken Olsen's background and personality led him to create an organization and a management style that deeply reflected his own family values and his engineering mentality.

To summarize, the evolving DEC story can best be understood if we consider that in the decades of the 1950s through the 1980s three things happened:

1. The evolution of the technology that DEC helped to create changed the market and created new competitive conditions that DEC had to deal with.
2. As a result of its economic success, the organization grew, aged, and evolved into new forms that had to be managed.

3. As a result of its economic success, the culture within DEC was strongly reinforced and was superimposed on a set of subcultures that evolved as the organization grew and differentiated. These subcultures reflected the core culture but developed other values that came into conflict with those of other subcultures and with the core culture.

The DEC culture did not coevolve with the changing technological context, with growing competition in the marketplace, and with changing consumer attitudes toward computing. Nor did the culture coevolve with the growth in size, maturity, and differentiation of the organization, thus creating organizational dysfunctions that, in turn, led to business failure. At the organizational level this failure has been described variously as

- marketing myopia in not seeing the advent of the personal computer (PC)
- arrogance in not seeing the need to adopt more open systems and in the attempt to compete directly with IBM
- strategic failure in not pulling together or aligning the disparate elements in DEC's product set
- leadership failure in not providing a unifying vision during a period of product diversification
- accounting failure in not identifying clearly enough which products or markets were or were not profitable
- structural failure in never making any business unit truly accountable
- human resource failure in not developing the management talent needed for divisionalization and to prepare for orderly succession
- governance failure in that neither the CEO nor the board acted effectively to correct many of the problems that were, in fact, highly visible and acknowledged

All of these explanations are true to some degree, but the big question to be answered is *why* these failures occurred. Why did an organi-

zation that was wildly successful for thirty-five years, filled with intelligent, articulate, powerful engineers and managers, fail to act effectively to deal with problems that were highly visible to everyone, both inside and outside the organization? Why did the culture not evolve? Cultural assumptions are a priori neither good nor bad, but they can become highly enabling of certain kinds of organizational evolution and highly dysfunctional or constraining for other kinds of evolution.

The ultimate managerial question, then, is how to simultaneously perceive, analyze, and manage the developmental stage of the technology and market, the developmental stage of the organization, and the developmental stage of the culture. If technological and market forces require a redesign of the organization, and if the culture constrains that redesign, then elements of the culture need to be encouraged to evolve in new directions or changed drastically to permit adaptive organizational evolution to occur. In order to manage such evolution it is necessary to understand that culture is a combination of many elements rather than a single entity.

Beyond this managerial question there is a broader social question. If economic survival requires an organization to compromise or abandon certain values on which that organization was built, should it maintain those values even if the organization as an economic entity dies in the process? Do economic organizations have the right to survive if important values are compromised? Or are organizations ultimately an expression of social values that if strongly held in a community, have the right to survive even if that means organizational failure?

HOW TO THINK ABOUT CULTURE AND CULTURAL DNA

Culture in an organization can be thought of as the organization's accumulated learning that becomes so taken for granted that it drops out of awareness (Schein 1992, 1999a). That learning covers both how the organization deals with its various external environments in accomplishing its primary tasks and how it manages its internal integration. If an organization is not successful in its early years, it will not develop a strong culture; on the other hand, if certain ways of think-

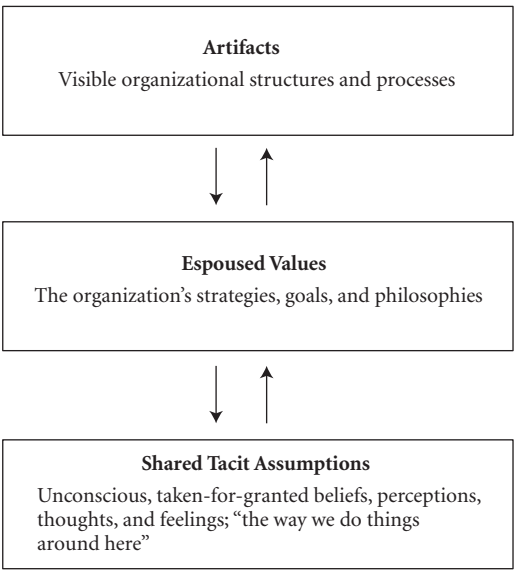

FIGURE 2.1. Three Levels of Culture. Source: Adapted from Edgar H. Schein, *The Coporate Culture Survival Guide* (Jossey-Bass: San Francisco, 1999), page 16.

ing, feeling, and behaving continue to work, they become taken for granted and eventually drop out of awareness except when they are taught to newcomers as the way to get along in that organization.

Once shared tacit assumptions have enabled the organization to succeed in its environment and to manage its internal affairs, they become very stable. They come to be taken for granted so much that efforts to change them are viewed as "crazy" because they are seen to be an attack on the very things that made the organization successful. This level of the culture is not only the essence but also the main source of stability that provides meaning and predictability for the members of the organization. Proposed culture changes are then inevitably sources of anxiety because they upset the ability of employees to predict what is ahead.

Culture can be observed at several levels (see figure 2.1). One can see and feel the overt *artifacts* of the culture in the behavioral patterns, physical layouts, rituals, and other manifestations that are clear but are not necessarily decipherable. We see what people do, but we may not

know why they do what they do. When we inquire about these artifacts, we elicit the level of *espoused values,* ideology, and aspirations—what members feel are the justifications and rationalizations of what they do. However, those espoused values often do not match with what is observed behaviorally, so there must be a deeper level that is actually the driving force, what I have called above the *shared tacit assumptions* that have come to be taken for granted. Assumptions need to be distinguished from beliefs and values in that they are so taken for granted that they become non-negotiable and tacit. Once we understand some of these tacit assumptions, the meaning of the artifacts becomes clear.

What eventually become the shared tacit assumptions start out in the early development of a group or organization as the values and beliefs that the founders of a group bring with them. These are usually imposed on new employees or selected for in people hired in the first place. If the behavior resulting from those values is adaptive and leads to success in the environment, then the beliefs and values come to be shared. If the behavior based on them continues to be successful, they gradually come to be taken for granted and drop out of awareness. They can then be thought of as deeply shared tacit assumptions.

The pattern of these shared tacit assumptions within any given culture can be thought of as its DNA, with various specific assumptions constituting "genes" that will produce certain "body parts" and "processes." The DNA and its component genes will determine what the organization is destined to become, what it is capable of becoming, and, most important, what it is incapable of becoming and what its "immune system" will reject. Only if there are mutations or planned changes in the DNA can this inevitable growth process be altered. Such changes cannot be produced unless culture carriers are themselves changed (for example, top leadership, dominant coalitions) or if those carriers experience a major personal transformation themselves. Mutations can become sources of change, as when managers who are "creative individualists" or "role innovators" (Schein 1970) are put into positions of power (for example, Welch at General Electric), or can become sources of "cancer," as in the case of some of the executives of Enron.

The most basic genes in the cultural DNA are the non-negotiable values and beliefs that creators of organizations claim as the basis for the right of that organization to exist. In the case of a technical entrepreneur these genes can be thought of as his or her technical vision that is sold to investors and ultimately to consumers. In the case of a religious movement it is the humanistic and spiritual values and beliefs of the founder that are initially attractive to followers. In the case of financial entrepreneurs it is the rationale of the deal they are trying to put together. However, these initial values and beliefs do not become shared and thereby become part of the cultural DNA until the organization succeeds and builds a shared history. The "organization" can be thought of at this stage as the "dominant coalition," the network of executives, managers, and employees who share the basic assumptions and who mutually reinforce one another as the organization evolves. To decipher these key genes one must keep asking questions: What in the eyes of this dominant coalition keeps the organization afloat? By what right, in their view, does it exist? What is its primary task in the larger sociocultural context? What functions does it fulfill for society?

It is important to recognize that the culture as evolved by the dominant coalition is not necessarily accepted by every member of the organization. Subgroups will evolve and form their own subcultures, and individuals will be present in the organization who do not accept many of the basic values and beliefs. But they will be conscious of the larger culture even if they do not accept all of it. As we will see, among the important characteristics of DEC were the degree of unanimity around certain key values and beliefs, the organization's consciousness of its own culture, and the degree to which it explicitly taught that culture to newcomers (Kunda 1992).

The existence of particular genes, certain non-negotiable values and beliefs, determines what the organization wants to do, is capable of doing, and also what it will resist. The dominant coalition may recognize the need for certain new behaviors to adapt to changes in the technological environment, but if the learning involved challenges some of these non-negotiable beliefs and values, the leaders and

members of the dominant coalition will not make the trade-offs necessary to acquire them. Insight and recognition are not enough to produce new skill sets if the gene demanding the outcomes of those skill sets is missing in the cultural DNA.

As is often the case in therapy, providing insight to the patient does not necessarily produce behavioral change or healthy adaptation. The pathological behavior may provide secondary gain in that it gets attention and maybe other kinds of rewards. Or the basic motivation to change may be missing because the learning of new behavior may seem too difficult or anxiety provoking. Sometimes people choose to live with their conflicts and pathologies because it is too "expensive" to give them up. In the same way, a mature organization with a strong culture can perceive accurately that it needs to change in various ways yet fail to make any constructive changes because the deep motivation, the will, and the skill to make certain trade-offs are missing.

In the case of organizations, their growth and development also leads to the equivalent of secondary gain. Ways of organizing that are no longer functional with respect to the environment can be very functional for the members of various subgroups within the organization. Thus, even organizational pathologies such as distributing resources across too many projects or destructive internal competition among units may not create levels of discomfort sufficient to make members pay serious attention to the danger signals coming from the environment. Also, like any biological organism, a strong culture will protect its integrity through an "immune system" that rejects employees or leaders who do not fit the culture or who want to change some of its genes.

THE COMMERCIAL GENE, OR MONEY GENE

In the case of economic organizations in a capitalist society, their primary task and basic function is to provide a reasonable return to investors in the production of goods and services needed by the society and, in that process, to provide employment and technical and social innovations that help the larger society to adapt to changing envi-

ronmental circumstances. For an organization to survive under these conditions it must have a gene that is concerned with making money, with economic growth and survival. The organization may have been founded on product, process, or service concepts that made it easy to make money initially, but sooner or later money per se becomes an issue as competition and technological evolution make the original idea economically less and less viable. The ultimate survival of the organization will then depend on the degree to which the commercial gene, or money gene, creates processes of innovation and adaptation that are geared to economic survival, even if that means abandonment of some of the original ideas, products, and services on which the organization was founded.

If we take this analogy into the DEC story, we will see that most of the genes in the DEC DNA were the technical and family values embedded strongly in an American individualistic tradition. DEC became a viable business because the basic individualistic, technical, and family values that Ken Olsen felt so strongly about created a management system that attracted extraordinary technical talent and produced a series of highly successful products that virtually sold themselves. In a sense, Olsen's vision put DEC in the right place at the right time to "catch a major wave." Ken Olsen anticipated a major societal value shift that henceforth would ascribe greater value to the person and would firmly place the individual instead of the monolithic mainframe computer in the center of the computing universe.

What was missing in this cultural DNA, however, was a set of genes for creating and sustaining a viable business, a commercial gene, a money gene, a set of shared values that would override the engineering and family values if those founding values became dysfunctional. This is not to say that DEC managers, including Ken Olsen, were indifferent to the values of making a profit, of giving a return to their shareholders, or of growing and stabilizing a business for the long haul. Ken Olsen cared deeply about profits and was proud to have produced profits in his very first year in business and every year thereafter until the late 1980s. At an espoused level, commercial values and the desire to run an effective profitable business were highly visible, and

DEC's management was continually reorganizing and developing new processes to improve "the business," to increase the value of the stock, to enhance the company's own economic well-being, and to protect the business for their stockholders and especially their employees. Over the years many professional managers were brought in to the organization who clearly had the commercial, or money, gene. But as we will see, the evidence that the money gene was missing in the basic cultural DNA was the unwillingness to honor those business values *above* the technical and family values. That would have required trade-offs that were never made.

For example, the presence of the money gene would have required earlier layoffs, pruning out some deadwood, setting clear priorities among development projects, killing some of their own obsolete products to free up resources for new development, designing products for new kinds of customers that were not seen to be glamorous, and giving more prestige to both marketing and finance as essential business functions.

Culture deals with all aspects of how an organization manages its relationship to the external environment and how it integrates its internal activities. We will therefore be dealing with all aspects of DEC's culture, especially some of its tacit assumptions about technology; strategy; and how to design, manufacture, market, and sell its products. A common mistake in cultural analysis is to limit the discussion to issues of how the human relations are handled in the organization. These issues are important, but equally important, or maybe even more so, are the tacit assumptions about strategy, markets, products, and finances, the functions that determine how an economic entity relates to its external environment.

SUMMARY

Throughout this book we will be referring back to the three streams: technology, organization, and culture. Of necessity, we will be selective in which specific historical details we focus on. DEC became a complex multinational corporation in a remarkably short period of time.

To lay out all of the events that occurred in all of the parts of DEC to make this happen is beyond our scope. But because DEC developed a very strong culture very quickly, it is possible to identify themes that ran throughout the company. It is also easy to identify variations—subcultures that grew up, sometimes by design and sometimes fortuitously because of the strong personalities of some managers. Some of these subcultures were to some degree countercultural with respect to the main values and assumptions fostered by DEC headquarters, yet they functioned effectively for a time within the larger cultural mosaic that was DEC in its prime. Indeed, as we will see, it was the interaction of these subcultures that was crucial in eventually creating some of the problems that DEC was not able to solve.

The DEC story occurred at a particular time in history and cannot be taken out of context. The information revolution was beginning to happen, and DEC played a major role in moving it forward. We will, therefore, also discuss the technical context within which DEC was created, how DEC changed the computing environment, how that environment in turn changed further, and how those changes created survival problems for DEC because it lacked the money gene in its cultural DNA. DEC's role in the evolution of computing is immense, but, as so often happens, the creators of change became victims of some of the very changes that they helped to create.

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