

# SELLING TECHNOLOGY

*The Changing Shape of Sales in an Information Economy*

ASAF DARR

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*To my parents, Nehama and Peretz Darr*

## CONTENTS

Foreword by Stephen R. Barley	ix
Acknowledgments	xiii
1. Sales Work in Culture and Practice	1
2. Sellers, Buyers, and Market Organization	21
3. Searching for Clients and Constructing Sales Ties in a Mass Market	35
4. Searching for Clients and Constructing Sales Ties in Emergent Technology Markets	59
5. Maintaining Sales Ties in a Mass Market	80
6. Maintaining Sales Ties in Emergent Technology Markets	94
7. The Changing Nature of Sales Work	116
A Note on Methods and Design	131
References	133
Index	139

## FOREWORD

Words! What are we going to do with them? They're so two-faced. Sometimes they enlighten. At other times, they beguile us and lead us astray. Too frequently—and this is the problem that should most concern us—words are elastic storage bins that are a bit too adept at tidying up the disorders of life.

To make the world navigable we stuff inside our words most of reality's odds and ends, if for no other reason than we need to get from here to there without too much tripping. Sometimes our stuffing is felicitous. It lies at the heart of categorization, without which there could be no enlightenment. In fact, linguistic stuffing only becomes troublesome when the odds and ends become so numerous that a word starts to resemble the catchall drawers where we stash those small artifacts of everyday life that belong nowhere else. Everyone knows the problem of a catchall drawer: once it becomes too full, it mysteriously mutates into the domestic equivalent of a black hole that sucks in batteries, nail clippers, pens, and countless other items, always just when we need them the most.

The worst offenders are nouns. Nouns may become increasingly pernicious over time, because once widely adopted, they become well fixed as signifiers. The word stays the same, while what it signifies keeps changing and diversifying. A noun can become so stuffed that it blinds us to the texture of the world and we wind up talking with hapless certainty about realities that no longer exist. This problem is especially acute for social scientists, because unlike natural scientists, we have the Sisyphean task of divining patterns in phenomena that morph quickly. Words for occupations are a prime example.

What people do for a living and how they do it are continually changing, if for no other reason than our technologies continually change. With new technologies and techniques, we start doing new things, stop doing old things, and do many other things in new ways. Thus, in a short span of decades, new lines of

work come into being, other lines of work meet their demise, and most of the remainder transform. Imagine how awed a farmer from Kansas in 1900 would be if he were suddenly transported by time-traveling aliens to the same field in Kansas today (assuming the field is still there). If it were not for the crops and the cows, he might not realize he was on a farm, much less recognize the person in the two-story vehicle as a farmer. Yet, like most people, sociologists of work and occupations sometimes write as if our two farmers from the Twilight Zone are, for analytical purposes, roughly the same.

The situation is worse for lines of work done by people we call “managers,” “engineers,” “operatives,” and “salespeople.” These nouns have become so full that they no longer tell us much about what people really do. As a result, economists and sociologists of work are ill prepared to describe, in any but the grossest terms, the nature of contemporary work or the reality of the modern workplace. Take the term “engineer.” Most sociologists still write as if it is reasonable to treat structural engineers, aeronautical engineers, chip designers, industrial engineers, mechanical engineers, and even software engineers as if they were structurally equivalent. In the 1870s it might have been reasonable to assume that most engineers were similarly employed since most of them were civil engineers. But in 2006 “engineer” covers so much ground that even engineers, who are widely reputed to have no sense of social structure, realize that engineering is a hodgepodge of different worlds and lines of work. Structural engineers and chip designers might as well be from different planets. Until sociologists begin to appreciate the many worlds of engineering, the many worlds of management, the many worlds of sales, and so on, we will lack the necessary building blocks for painting accurate images of work and organizing in a postindustrial economy, whatever that might prove to be.

This book is an important step in the right direction. Over the course of *Selling Technology*, you will learn that our images of salespeople—built largely on our encounters with Fuller brush men, Willy Loman, *Glengarry Glen Ross*, and the person who sold us our last automobile—are woefully anemic. To be sure, you will find that people who sell certain kinds of products—in this case transistors, capacitors, and the other standard components of electronic devices—still bear a family resemblance to the archetypical salesman. They travel to customers in cars packed with catalogs and samples, and they attempt to ingratiate themselves with would-be buyers. They sometimes drink heavily, eat good meals, and slap people on the back in the hope of a sale. Some probably even have a set of golf clubs in their trunks.

But you are also about to meet other salespeople whose work is more like that of an electrical engineer or a software developer in a development lab. They design—or more accurately, redesign and reconfigure—microelectronic boards and software to interface with their customers' equipment. They are as likely as not to tell would-be customers that they cannot sell them anything useful. They drink, eat, and perhaps even occasionally slap people on the back, but not primarily in the service of a sale. The fact is these salesmen *are* engineers. No one else could do their job. These are salespeople who work primarily on things, not people. In this sense, they turn our archetype of sales on its head.

As only an ethnographer can, Darr takes us inside to show us how these two worlds revolve around fundamentally different kinds of markets and different types of technology. Darr's answer to the question "What is a salesperson?" is clearly, "It depends." The book's plea is for a bit more contingency in the study of work. Its promise is that sociologists of work can make surprising discoveries about how work has changed if we just begin unpacking our most hoary nouns.

The time has come to start doing for engineers, managers, technicians, and others what Darr has begun to do for salespeople. Our nouns have inflicted too much homogeneity on our data and our theorizing, and we are in dire need of a more nuanced vocabulary for describing the division of labor. This is precisely why we established Cornell's Collection on Technology and Work. *Selling Technology* is a welcomed addition.

STEPHEN R. BARLEY

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Short sections of the book were previously published as part of journal articles. The discussion on pages 110–113 derives from my paper “Control and Autonomy among Knowledge Workers in Sales: An Employee Perspective,” published in *Employee Relations* in 2003 by Emerald. The theoretical discussions on pages 7–8 and 122–125 are based on my chapter in Warhurst, Keep, and Grugulis (eds.), *The Skills That Matter*, published by Palgrave in 2004. The discussion about gifting practices on pages 84–88 is informed by my paper “Gifting Practices and Interorganizational Relations: Constructing Obligation Networks in the Electronics Sector,” published in *Sociological Forum* in 2003 by Springer Academic Publishers. Figure 3 in the book is also based on this source. Finally, a few field excerpts and interpretations scattered in the book also appear in two of my papers published in *Work, Employment and Society*, volumes 14 and 16, in 2000 and 2002 by Sage Publications, and in a paper coauthored with Ilan Talmud that was published in *Organization Studies*, volume 24, in 2003, also by Sage. Reprinted by permission.

# SELLING TECHNOLOGY

“And he was eighty-four years old, and he drummed merchandise in thirty-one states. And old Dave, he’d go up to his room, Y’understand, put on his green velvet slippers—I’ll never forget—and pick up his phone and call the buyers, and without ever leaving his room, at the age of eighty-four, he made his living . . . when he died—and by the way he died the death of a salesman, in his green velvet slippers in the smoker of the New York, New Haven and Hartford, going into Boston—when he died, hundreds of salespeople and buyers were at his funeral.”

[Willy Loman describing his role model, Dave Singleman, in Arthur Miller’s *Death of a Salesman*]

“You ask about anything that has to do with the design. At this point we are talking technology, you are talking “What does this chip do? What does that pin do? What is the speed here? . . . Tell me from the artwork where this node is supposed to be on the board.”

[Sales engineer describing initial sales interactions with buyers of emergent technology]

## CHAPTER ONE

# *Sales Work in Culture and Practice*

The emergence of a service economy has been a defining feature of advanced industrial societies. Citizens in the United States and Europe are increasingly producing and consuming services rather than industrial goods, which dominated the economy for most of the twentieth century. The emerging service society is supported by the growing use of computers and computer-mediated communication in our daily life and in the workplace. For example, the Internet and the integration of telephone and computer systems have allowed new forms of service organizations such as call centers to proliferate. The outsourcing of accounting services by U.S.-based companies to Indian companies, among others, is but another example of new forms of service organizations operating over computer networks in a global economy. As part of the current transformation, sales work has become increasingly important, and the number of people working in sales occupations has grown steadily.

Between 1950 and 1991, the percentage of those involved in sales work grew from 7 to 12 percent of the U.S. labor force (Barley and Orr 1997, 3). This rate of expansion was second only to the growth of professional and technical occupations. Sales work has also become a diverse phenomenon, and the family of occupations that it covers ranges from the socially accepted image of pushing hamburgers across the counter at McDonald's, or selling products door-to-door, to the very different process of selling consulting services to firms wishing to implement organizational software, to firms needing fully customized design projects. One important consequence of these new areas of activity is the flux of technical experts into the sales force. In cutting-edge industries in the United States, the percentage of engineers in the sales force almost doubled during the 1980s, from 12 percent to 22 percent (U.S. Department of Labor, 1985, 1988, 1991). This percentage remained stable into the 1990s. Yet despite the growing

complexity, range of activities, and changing skill composition, sales work has remained a neglected area of study. To date, only a handful of studies have addressed this work practice, and most of them have focused on retail, insurance, and direct selling. This lack of scholarly evidence has allowed our concept of sales work to be largely shaped by cultural stereotypes.

We tend to think about sales through popular images of the Yankee peddler and the car salesman. The media and works of fiction such as Arthur Miller's *Death of a Salesman* have proved pivotal in shaping our view of sales work. Miller portrays a tension experienced by salespeople, between autonomy and self-sufficiency on the one hand and a lonely life (and death) on the road, where green slippers come to substitute for a real home and where family and friends are always far away. Salespeople—the foot soldiers of capitalism—also experience a constant tension between the ongoing hope to close a deal and the harsh realities and grave disappointments that face them in their daily work. Coupled with the view of salespeople as demonstrating loyalty to the product but not always to the truth, these depictions in Miller's work have been influential in shaping our perceptions of sales.

Our cultural stereotypes of salespeople also include other elements: low levels of formal education and technical skills; low pay but ample opportunity to earn commissions; limited career opportunities; strong social skills which, as part of brief sales encounters, include manipulating the information provided to prospective buyers and calling on obligation or evoking guilt to close a deal. This popular image is not particularly flattering and is reflected in the low status that members of our society attribute to salespeople.

Although relying on cultural stereotypes might be useful for easy communication among people, it carries the risk of solidifying a common yet false view of sales and salespeople and consequently limits our understanding of recent changes in both the organization and the content of sales work. If we accept the cultural stereotypes, we might assume that the terms “sales” and “salesperson” continue to have the same meaning they have always carried and encapsulate the same sets of skills and work tasks. Yet, as with other occupations, the content of sales work has changed dramatically over the years. Sales have always been part of a socioeconomic system, and when a system changes, so does the meaning of the term. More precisely, the shifting content and boundaries of sales work have been grounded in changes in production paradigms.

The term “production paradigm” denotes a system of work practice and ideology that dominates the world of work at any given time. Mass production, for example, was the dominant production paradigm during the twentieth century.

That production paradigm included ideas and practices such as the standardization of skills and products, the assembly line, mass marketing and mass consumption, and the separation of design, production, and sales by clear conceptual and organizational boundaries. Yet today, in industries leading the digitalization of production systems and services, sales work has been at the forefront of a paradigmatic change. Here, sales work has become an important area of study because it constitutes a new form of boundary-spanning work, transcending traditional boundaries within a standard division of labor. The underlying reason for the unique features of sales in high-tech settings is that the product being sold is not the good per se, but the process of adaptation to specific clients' needs, which is called "customization." The shift from a product to a process causes the blurring of boundaries separating design, production, and sales in high-tech settings and has important implications for work, skills, and the organization of knowledge in our society.

This book describes and explains the changing nature of sales through the daily experiences of salespeople, engineers, managers, and purchasing agents who construct markets for emergent technologies through their daily engagement in sales interactions. By the term "emergent technology" I mean cutting-edge artifacts whose potential uses are only beginning to emerge. In the high-technology settings in which emergent technology is traded, sales work deviates sharply from our traditional cultural images. Instead of salespeople with no formal education, we find increasing numbers of engineers in the sales force. Rather than salespeople relying on social skills, we see socio-technical skills becoming central for closing a deal. Instead of brief sales encounters, we witness the emergence of temporary work organizations, spanning two or more organizations, composed of sellers and buyers' engineers engaging in codevelopment. A growing number of work tasks and skills previously performed and mastered in the design or production phases have become part of the sale of emergent technology. In addition, technical salespeople in high-technology settings assume the role of coordinators of the customization process, not only brokers, as in mass markets.

This book provides a grounded empirical account of sales work in an area that has been the subject of insufficient study, namely contemporary industrial markets where firms trade with other firms. To recognize the important variations in sales, the book offers a comparison between work practices in mass and emergent technology markets within a single industry, electronics. Mass markets and the sales work conducted within them are part of the industrial era, and they represent the organization of sales in the mass-production paradigm. A detailed

description of sales practices in mass industrial markets provides an important benchmark against which we can highlight the unique features of sales in emergent technology markets. Without such a comparative design, one could argue that what I see as the unique features of sales in emergent technology markets are typical of any industrial market. The comparison made with the sales of emergent technology that this book offers can also provide insight into the future nature and organization of sales work under emerging production paradigms in a world experiencing an ever-increasing rate of technological change.

To understand the changing nature of sales work in emergent technology markets, we first need to make an analytical distinction between “product” and “process.” The separation of the process of production from its final product, the commodity, has been a defining feature of the mass-production paradigm. The manufacturing process, previously carried out at various workshops by skilled craftspeople, was centralized during the industrial revolution, and clients were largely excluded from the design and production processes. Standardization and mechanization in a modern factory, marketing, and elaborate distribution channels have allowed producers to shape or to direct the demand side of the market. Recently, consumers and social interest groups have come to question this separation between the process of production and the end product, as they struggle to eliminate production processes that involve child labor or harm living creatures and the environment. A good example is the social outcry against the use of a certain type of net in tuna fishing because it can harm dolphins. Here, consumer groups show great interest in the process of production, not only in the end product, the canned tuna. Yet in emergent technology markets, the substitution of a process for a product has nothing to do with social movements or consumer groups. Here, where there is a lack of agreement about the future use of products, sellers sell a concept, a goal that can be achieved only through a lengthy customization process. During this process, the buyers and the sellers negotiate the exact features of the final product.

Selling a concept or a goal is not restricted to emergent technology. The same is done in the sale of an array of specialized consulting services of various kinds, which has become a booming industry. For example, in recent years the market for the adoption of enterprise resource planning (ERP) has expanded rapidly (Scott and Wagner 2003). ERP integration and localization spans months and even years, and what is sold initially is a concept, a goal of organizational change. The adoption process includes the sale of various consultancy processes at different junctures of the process. Before making purchasing decisions, large firms hire consultants as supervisors of the integration process and as evaluators of the out-

comes of the adoption process. Thus, the insights of this book on the consequences of the shift from a product to a process might be extended beyond the sale of emergent technology to other industries in which a process, rather than a product, is sold.

Four main issues with broad theoretical and practical implications arise from the comparative ethnographic account of technical sales that this book offers: (1) a blurring of boundaries separating design, production, and sales work; (2) the rise of a highly skilled sales sector; (3) a growing interdependency of social and technical skills; and (4) the emergence of new forms of sales relationships and control mechanisms over technical experts who work in sales.

### **The Blurring of Boundaries: Design, Production, and Sales**

Clear boundaries separating design, production, and sales work were constructed during the industrial era as part of the growing division of labor and the separation between planning and executing work tasks. A notable example is the scientific management school, which outlined some of the basic principles of a new paradigm in manufacturing—namely, mass production. Here, the role of the engineers in production plants was extended to include time-and-motion studies on the shop floor and the reorganization of the work process. The role of production workers, previously in charge of planning and executing their work activities, was reduced to execution only. The attempts to divide the labor process into distinct stages were diverse and intensified during the twentieth century with the rise of large corporations governed by elaborate bureaucratic structures. Here, the boundaries separating design, production, and sales were inscribed in formal structures, roles, rules, and work procedures. Yet today, in emergent technology markets, these boundaries are in question.

The sales engineers in emergent technology markets are in charge of the adaptation of cutting-edge products to the specific needs of prospective buyers. As part of customization, and in sharp contrast to sales in mass markets, clients are allowed to influence the design process in the manufacturing firm. As a result, the engineering department must constantly integrate clients' inputs, and the manufacturing department must quickly respond to design changes. The sales engineers ensure that this process functions well. In this respect, they engage in boundary-spanning activity. Robert, who worked in a small start-up firm I studied, described what he perceived as the essence of his work as a sales engineer in an emergent technology market:

People like to think about a very simple picture, like the product simply jumps from engineering into manufacturing. They call it "throwing over the wall." But it does not work well when it does happen, and because it does not work well, . . . people like me especially, right near the wall, are straddling the wall, knocking down on both sides of it.

Robert described the blurring of boundaries between design and production that occurs in emergent technology markets as a result of the need to constantly integrate clients' inputs into the design and manufacturing process. But Robert's special role in the customization process also points to a more fundamental shift in emphasis from design and manufacturing during the industrial era to sales work in emergent technology markets.

During the industrial era, firms' owners and managers directed most of their attention to the shop floor and to the constant improvement of production processes via standardization, reorganization of production activities, and technological change. Today, because the product in emergent technology markets is a process involving the client, the whole firm increasingly depends on the work of the technical experts who manage the sales process. The sales process includes activities previously performed during other phases in the production chain. Sales departments in emergent technology markets employ the kind of technical experts who were buffered from market exigencies during the industrial era but who, today, serve as front-line workers. One conclusion of this book is that there is a pressing need to develop a new terminology to discuss the changing division of labor in emergent technology markets. Sales work, which has been a neglected area of study, must move to center stage if we wish to understand how design and production work are increasingly intertwined with sales. The flow of technical experts to front-line positions leads to the second theoretical implication of this book.

### **The Rise of a Highly Skilled Sales Force**

A shift from blue-collar to service and sales occupations, on the one hand, and the vast expansion of the knowledge sector, on the other, are depicted in the literature as two seemingly contradictory trends in the contemporary world of work. When we think about the expansion of the service and sales sectors, we often imagine low-skilled, low-paying temporary jobs with minimal levels of autonomy at fast-food restaurants, call centers, and retail stores. Knowledge work, in contrast, epitomizes our cultural image of the highly skilled and well-

paid scientists working in R&D departments, where they enjoy high autonomy as they harness science to serve industrial production. In reality, the impact of the shift toward service and knowledge work on the types and level of skills required is not always clear. In fact, this book points to a neglected topic in the existing literature, the field of technical sales and sales support, in which the two trends merge. The sales engineers in this study feel comfortable in their firms' R&D labs as well as in interacting with clients at trade shows. The technical content of their sales interactions with clients leaves little doubt that technical salespeople are knowledge workers. Yet they formally work as part of the sales departments and thus constitute an emerging class of knowledge workers who work in sales and sales support.

Although it is widely argued that salespeople and interactive service workers are being de-skilled, this book points to new forms of sales employing new sets of skills. Recently a small but growing body of literature has suggested that the sales function in those industries leading the transformation of the socioeconomic infrastructure, such as microelectronics, is going through a major process of up-skilling (Darr 2002, 53–54). Here, we see a flux of technical experts to front-line positions in the sales force. Similarly, sales support in the software industry involves technical experts (Pentland 1997). This is a clear indication that knowledge and service work are increasingly intertwined in sales of complex technologies. The ethnographic data presented in this book describe in detail the causes and consequences of the rise of a highly skilled sales force. The findings suggest that engineers are moving horizontally into occupations with significant interpersonal and negotiation components. One distinct outcome of the rise of a sales force composed of technical experts is a growing interdependency between social and technical skills.

### **The Growing Interdependency of Social and Technical Skills**

The ethnographic material I present in this book challenges the common misconception that a clear boundary exists between social and technical skills. Contrary to many of our beliefs, this book argues that as the technical complexity of sales increases, so does the need to depend on social and interactive skills. In fact, it is impossible to differentiate the two types of skills in the daily work of sales engineers. Governments and economic institutions have long tried to quantify types of skills and the complexity of different lines of work. The analytical distinction between technical and social skills underpins some of these attempts. For example, much of the sociological research on the skill levels of

different jobs, which is based on the American *Dictionary of Occupational Titles* (DOT), combines three main dimensions—complexity in dealing with things, with people, and with data—to create an overall measure of job complexity (Attewell 1990, 426). Technical skills are associated mainly with the manipulation of things, whereas social skills are related mostly to the complexity of dealing with people.

In the description of technical sales in the following chapters, it is clear that social and technical skills are inextricably intertwined and are increasingly interdependent in the sale of emergent technology. Strong technical skills are required in selling emergent technology. The sales engineers I studied held formal engineering degrees, and most of them came from a design engineering background, where they had acquired intensive hands-on experience. But customizing emergent technology also requires strong interactive skills because the sellers depend so much on their clients' information about products' applications. Sales engineers have had to master both types of skills, and to activate them jointly, to assess the feasibility of customization and to manage the sales process. As they have struggled to extract knowledge about the future applications of their products from the clients' engineers, they also have constructed new types of sales relationships.

### **The Emergence of New Forms of Sales Relationships**

The sales process of emergent technology lasted over extended periods of time, sometimes years. Following initial interactions at trade shows, the sales engineers and the clients' engineers slowly developed a set of social ties around the customization process. As part of customization, they engaged in codevelopment, which required frequent face-to-face interaction. They revised sketches, ran tests, and wrote codes together. In fact, I contend in this book that the sales relationships constructed by the technical salespeople in emergent-technology markets represent a type of quasi-vertical integration by building and maintaining ephemeral yet intensive cross-firm expert ties. The sellers and the buyers compose a temporary work organization that transcends both the buying and the selling organization. This temporary work organization is governed by professional norms and practice and is maintained as long as an adaptation project lasts. Within these temporary organizations in emergent-technology markets, sales relationships are stratified to a greater extent than sales relationships among sellers and buyers of standard electronic components, with technical experts holding the most powerful positions.

Economists typically extend their atomistic and rational model of markets from consumer markets to industrial markets. They tend to depict sales relationships among firms or individuals as ephemeral and lacking social structure. The story of the salespeople presented in this book supports a radically different portrait of sales relationships, focusing on the social embeddedness of economic activity (Granovetter 1985; Uzzi 1997). The ethnographic material presented in the following pages suggests that sales ties will be more robust—and will be activated more frequently with high levels of social cohesiveness—than economic theory would predict. This is true not only in emergent technology markets, in which sales work depends on social interactions between technical experts, but, somewhat surprisingly, even in the sales of mass-produced electronic components. The four broad themes described previously run through the story of the sales work of mass-produced and cutting-edge electronic products. They present a clear justification for the study of sales practice in contemporary markets. Yet they are not superimposed on the realities of sales work. Instead, this book offers an inside look at the market.

An underlying assumption of this study is that what economists call a “market” is structured through ongoing and daily sales interactions. Salespeople engage in a wide range of behaviors designed to build and to secure the loyalty and trust of buyers, to build rapport, and to create an obligation in the buyer to buy from them and not from the competition (Bechky and Osterlund 1994; Clark and Pinch 1988; Prus 1989a). Instead of discussing markets in the abstract, this book offers a look at markets from within, based on the experience and the perceptions of sellers and buyers. By providing an inside look, the book demonstrates how the actions of sellers and buyers, which are constrained by different social institutions, structure different types of marketplaces. To demonstrate some of the benefits of being inside markets, the next section provides a brief comparison of the activities of sellers and buyers and the social institutions that constrain their behavior in the field of real-time computing and passive components within the electronics industry. Real-time computing represents an emergent technology, whereas passive components represent a standard and mass-produced electronics product.

### **Inside Markets**

Real-time computing is one area of microelectronics that has spearheaded the information-based service economy by allowing computer networks and computerized production to proliferate. Products in this area assist the transfer, stor-

age, and processing of digital signals in real time and support many of the Internet applications we all use. Despite its growing prominence, much of the trade in cutting-edge products in real-time computing is still conducted at a small trade show, nicknamed by its participants "The Traveling Circus." This show is held more than forty times a year at different cities across the United States and in Western Europe. The trade show allows small start-up firms to bring their cutting-edge technologies to the doorstep of prospective clients, mainly large corporations and government agencies, as Yankee peddlers did a century ago. Yet the sale of emergent technologies differs markedly from our cultural and scholarly images of sales work, which were shaped during the industrial era.

To highlight the special features of sales work in emergent technology markets, it is helpful to compare it with the sales of more standard, mass-produced products in the same industry: sales of capacitors and resistors. My informants in this study grouped capacitors and resistors into a larger category of products they dubbed "passive components," which also included items such as cable ties and cable locks. As I explain in this book, the practice of selling passive components contrasts sharply with the sales of emergent technology. All passive components are highly standardized and mass-produced, mainly in the Pacific Rim but also in the United States. The sales process in passive components, as in real-time computing, includes trade shows, but their purpose in the two areas is quite different.

For more than three decades, a major distributor of passive components in a small industrial city in upstate New York has invited about fifty of the manufacturing companies it represents to participate in a local trade show. These manufacturers are mostly national and international firms that do extensive business through this distributing company. In the terminology used by the show organizer, participants are "top vendors." The distributor is in charge of coordinating the show but does not carry the whole cost. Vendors are asked to pay for their booths according to their size, to ship in their displays, and to set them up as they like. Large manufacturing firms buy larger spaces and tend to dominate the show. In addition, each year one top vendor pays for the right to sponsor a seminar on its products. Participation in the seminar is restricted to large clients and includes lunch. The organizer of the show requires participating vendors to have a salesperson, a product manager, or a high-level manager in the booth to assist purchasing agents and managers visiting the show. The organizer prints invitations to all of its distribution clients. Most visitors to the show, according to the organizer, are purchasing agents and heads of purchasing departments. The organizer of the show also invites a few engineers

who have the power to recommend specific component purchases to their firms' purchasing departments. But the vast majority of the vendors, as well as the visitors, are not technical experts. In fact, many of the salespeople have a history of selling real estate or insurance policies. According to a vendor who has participated in the show for the past eight years, the show attracts, on average, a few hundred visitors. The show I visited took place in a hotel ballroom next to a major highway. Setup time for vendors was 8:30 a.m. to 1:00 p.m. At 1:30 p.m., the doors opened and buyers poured in. The show lasted until 7:00 p.m.

One prominent feature of this show was socializing over alcoholic beverages. At the registration booth, each visitor received a pink slip for two free drinks at the huge ballroom bar. The show's organizers had also provided vendors with dozens of pink slips, so they could treat their old and prospective clients to free drinks. By 5:00 p.m., most of the visitors were standing at the bar, having one drink after another and chatting with vendors, clutching their own drinks. The show's organizer also served free food to all visitors. To add to the party spirit, vendors offered small presents like pens, mugs, and digital clocks adorned with their companies' logos.

The atmosphere at the passive components show was like that of a county fair. Two clowns walked around the huge ballroom that housed the show, handing visitors balloons bearing the logo of a large manufacturer of passive components. Vendors played loud music through large speakers. A salesperson I interviewed commented on the festive spirit:

And there is booze, there is eats, snacks, and you pick up literature and talk to people. What I do is I get a plastic container, like a fishbowl, and they throw their business cards in. . . . And then you have the cherry pickers; they want all the free samples, so then you start slapping hands. . . . That's what my company pays me for, to determine who gets what, because you have a lot of people who say, "I want this; I do that" and they are not telling the truth. So I guess that is where my job comes in, to be a policeman.

As his comment indicates, the salesperson tried to make the process of gift giving cost-effective. Through brief conversations with the buyers, he tried to identify the most "qualified leads," as salespeople called promising buyers, and gave them small gifts, in the hope of inducing them to buy his firm's products.

The socializing and drinking involved in sales at the passive components trade show conforms to the social glad-handing typically associated with sales work. Yet it stands in marked contrast to the sales work in real-time computing. In this book, I focus on the unique features of sales work in this emergent technology market, some of which can be seen in the interactions between sellers and buyers at one show of the "traveling circus" I attended in Houston, Texas.

The trade show in real-time computing was held at a hotel, just next door to large potential clients such as Texas Instruments and NASA. The show organizers offered the visitors free admission, free parking, and a free lunch, which included cold cuts, sandwiches, and soft drinks. Most visitors, about 90 percent of them design and test engineers, arrived at the show just before lunch. Upon arrival, the visitors registered and each received a name tag that specified the visitor's organizational affiliation. Many of them preferred wearing their firms' security tags, imprinted with their photographs, as if they took special pride in belonging to their employing organizations. The visitors would walk into a huge ballroom where about forty companies displayed their products. For about \$500, vendors could participate in two paired shows held in two nearby cities within a single week, the Houston show being paired with one in a Dallas suburb.

The organizers supplied vendors with standard invitations for their clients. The invitation carried the show's logo, a map to assist visitors in getting to the show, and a list of all vendors participating in the show and the different products they intended to display. The vendors themselves sent these invitations to existing and prospective clients in the vicinity of the traveling show. To motivate vendors, the show's organizers had instituted a prize for the company that attracted the most visitors to the show. At the registration desk, the organizers asked all visitors who had invited them and kept a list of visitors organized according to the companies that had extended the invitation. At the end of the show, the organizers would announce the winner through a loudspeaker. The prize included a free trade show and a \$100 cash prize to the salesperson. In the cooperative spirit of the show, the money was typically used to invite the other salespeople for drinks later in the evening, once the show was over. This social gathering allowed the salespeople, who knew each other from previous shows, to relax after a long day, to share stories and gossip, to learn about new business and employment opportunities, and to plan shared activities, such as golf and sightseeing, for the following morning.

In marked contrast to the passive components show, the show organizers in the traveling circus made sure that all display tables in the show were of equal size and were covered with standard white cloths. No company, regardless of its

size or the amount of money it was ready to pay, could display its products on more than one table. The standard display tables, according to the show's founder, were designed to prevent large companies in this emerging industry from dominating the show. These rules of the game at the traveling circus were part of the democratic features that the founder had initiated. The founder confessed during an interview that his original intention in starting the show was to identify potential applications and prospective clients for the cutting-edge technologies produced by his own start-up firm. It seems, however, that many other start-up firms had also been experiencing uncertainty about the identity of potential clients, and the first show he organized turned out to be a smashing success. He soon closed his firm and made the trade show his main line of business. Since then, he has also become the publisher of a leading trade journal in the area of real-time computing.

While walking through the displays, the visitors, mostly very young men (the sellers and buyers included hardly any women), soon realized that they were unfamiliar with the vast majority of exhibitors, representing mainly small "engineering boutiques" from the Northeast and the West Coast. The innovative products on display were produced by small groups of highly qualified design engineers in a process resembling craft production during the preindustrial era more than mass production in advanced industrial societies. Although the products in real-time computing that were offered for sale were based on a cutting-edge technology and were exchanged among firms operating in an advanced economy, the visitors' confusion was typical of someone visiting a local market in a preindustrial society. The visiting engineers, walking alone or in small groups, were clearly uncertain about the quality of the products on display, their production costs, and their going price. The visitors quickly understood that they had to engage in intense conversations with the vendors in order to reduce their uncertainty. They also hoped that the vendors, standing in front of their display tables and trying to make eye contact with the visitors, would have strong technical backgrounds to help them solve some of their own design problems by integrating the products on display into their prototypes.

While observing at the Houston show, I stood next to the display booth of Bob, one of my main informants, whose start-up company offered specialized computer boards designed to transfer and to process large chunks of data in real time. From my position, I could see colorful banners hanging over the other display booths, inscribed with companies' names, and bearing the pictures of tigers and lions all ready to jump at the viewer. The colors and the sounds of intense conversations between sellers and buyers were overwhelming, and visitors

had to concentrate to focus on the display tables, where circuit boards were showcased on special plastic stands, as if they were fine jewelry. It was 2:00 p.m., and the show, scheduled to close at 3:00 p.m., was slowly winding down. Hotel employees were clearing the lunch tables, and most of the visiting engineers had left. About thirty visitors still walked through the narrow corridor between the display tables. Bob, evidently tired and probably hungry after skipping lunch, was standing before his display table, his hands behind his back. He was dressed casually, not in a suit and tie like his counterparts selling standard technology, but in a polo shirt with a company logo. In fact, he dressed much like the engineers who visited the show, as if declaring he was a member of their professional community, not a regular salesperson.

One of the visitors, with his company's security tag bearing his picture clipped to his shirt, passed next to the display booth but made no eye contact with Bob. Bob looked at the visitor's name tag and greeted him in a cheerful voice: "Hi, Jim, how are things at X company?" Jim said, "Hi," approached the display table, and picked up one of the single-board computers on display. Jim touched one of the chips, carrying the name Intel 360, and, still looking down at the board, asked, "What does this board do?" Bob told Jim it was actually a powerful computer designed to transfer and to process digital data in real time. Real-time computing is an emergent industry, with a few industry standards. So Bob described to the visiting engineer the industry standard to which the board adhered:

SELLER: This is a VME bus, and we also have [boards for a] PCI industry standard. What do you need it [the board the visitor is holding] for?

BUYER: It's a new project.

*[Looks around and whispers something I cannot hear]*

SELLER: Do you use a VME bus?

BUYER: Yes.

SELLER: What sorts of interface?

BUYER: Oh, well, we have VME, SCSI [Small Computer System Interface<sup>1</sup>].

SELLER: Do you use something like C3 ETM?

BUYER: I don't know; we haven't decided yet.

<sup>1</sup> A SCSI is a fast bus used to connect computers to their external storage devices, such as disks and CD-ROMs.

SELLER: Until you determine what kind of interface you would like to use, there is little we can do.

[*The seller smiles and offers his hand for a handshake.*]

BUYER: Yes, that's right, thank you.

[*Shakes the hand of the seller*]

SELLER: Thank you.

This sales interaction is clearly different from the type of interactions we encounter as consumers in retail markets. When we enter a store to buy a product, we are typically the ones who initiate a series of questions to the vendor about the product we want. We might be interested in information about quality or about the price of specific products. But we hardly expect the salesperson to ask us detailed questions about how we would like to use a shirt or even a car we wish to purchase. Living in an industrial society, in which standardization is ubiquitous, we tend to view the applications of the mostly mass-produced and standard products we consume as taken for granted. But at the trade show the seller, not the prospective buyer, initiated most of the questions, which centered on the features of the client's application. In fact, to an outside observer, it seemed as though the visiting engineer had been put through an interrogation.

The level of standardization in real-time computing is low because it is an emergent technology. Standardization means more than mass-produced and interchangeable parts. It also means that the future use of products is fixed. In real-time computing, the exact future use has to be negotiated between sellers and buyers in almost every sale. In theoretical terms, emergent technologies enjoy an "interpretive flexibility" (Pinch and Bijker 1987, 40). Different social groups—buyers and sellers in this case—hold different interpretations of the design and use of the artifact being sold. The sellers and the buyers must engage in an intense technological dialogue (Pacey 1990, 146–47) with clients' engineers in order to arrive at a shared understanding about a product's application. A technological dialogue consists of the interactive exchange of technical details dealing with the adaptation of craft-produced high-tech products to the specific needs of clients. Customizing products—that is, adapting them to clients' needs—must take place in the vast majority of transactions in real-time computing. The sales engineers manage the customization process, which starts as early as the initial sales interactions with prospective clients at the trade show. The unique pattern of interaction in emergent technology markets, by which the prospective buyer goes through a screening process initiated by the seller, re-