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Organization and Coordination in Geographically Concentrated Industries

Michael J. Enright

Economic activity requires the coordination of a variety of functions within and between firms. The organization of economic activity and the mechanisms used to coordinate such activity have become increasingly central issues for industrial economists and business strategists. While economists explore the advantages of markets versus hierarchies, business strategists are turning their attention to the notion of the boundaryless firm, and historians are studying the evolution of coordination mechanisms in particular companies and industries (see Williamson 1985; Hirshhorn and Gilmore 1992; papers in this volume). In this regard, geographically concentrated industries, industries in which many or most of the competitors are located in close proximity, provide unique opportunities to examine the organization of economic activity and the nature of coordination both within and among firms. The main reason is that geographic concentration increases the effectiveness of the external coordination mechanisms available to firms, and therefore allows for a wider variety of organizational forms and coordination mechanisms than might otherwise be observed. The boundaries between firms in such industries are sometimes blurred and often fluid, tending to respond to changes in product, technology, markets, competition, and government policy.

The first section of this paper introduces the phenomenon of geographic concentration, or localization, in industry. Particular attention is paid to the industrial organization of localized industries and the influence of localization on firm structures and incentives. Section 4.2 discusses the evolution of organizational forms and coordination mechanisms in three localized industries: the Hollywood motion picture industry, the Prato-area textile industry, and the Swiss watch industry. Though each example discusses the historical develop-

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ment of organization and coordination in the localized industry, the focus is on the transformations that have taken place in the twentieth century. Section 4.3 explores some of the implications of the present work for students of economic and business organizations.

4.1 Geographically Concentrated Industries

Firms in a given industry are often located in close proximity to each other.¹ Geographic concentration within industries is pervasive, spanning large portions of the economies of most nations. In the United States, Detroit, Hollywood, Wall Street, Madison Avenue, Silicon Valley, and Route 128 are associated with particular industries. The world's two leading motorcycle companies and two leading musical instrument producers grew up in the Japanese city of Hamamatsu. Three of Japan's forty-seven prefectures produce the vast majority of the nation's silk and woven synthetic fabrics, whereas nearby companies account for the bulk of Japanese textile machinery, synthetic fiber, and carbon-fiber production. All of Germany's leading cutlery firms are located in Solingen, whereas the pen and pencil industries are centered in Nuremberg, optical equipment in Oberkochen and Wetzlar, tooling in Remscheid, and jewelry in Pforzheim. In Switzerland, Geneva and the Jura area are the centers of the watch industry; Basel is the home of the Swiss dye, pharmaceutical, and freight-forwarding industries; and Zurich is the center for banking, trading, and other financial services. Some of the most striking examples of localized industries are found in Italy. Sassuolo, a small town near Bologna, produces roughly 35 percent of the world's ceramic tiles. Montebelluna, in the Dolomites, supplies approximately 50 percent of the world's ski boots. Carrara is by far the world's leading center for stonecutting. Two areas, Arezzo and Valenza Po, account for more than \$2 billion in precious-metal jewelry exports each year. Bologna is the home of nearly two hundred packaging machinery firms. Prato and Biella account for approximately 80 percent of Italy's wool textile output.

Despite the importance of geographically concentrated industries in most economies, such industries have only recently begun to capture the imagination of economists and business strategists.² Efforts to explain the development and dynamism of areas such as northern Italy and to explore what might be termed non-Chandlerian business development, or development through clusters of small firms rather than large managerial firms (see Chandler 1990), have inevitably focused on geographically concentrated industries. The present work seeks to add to the growing literature on this important topic.

1. For a more complete description of the industrial organization of geographically concentrated industries, see Enright 1990.

2. Porter (1990) emphasizes the role of localization in the development of internationally successful industries. Krugman (1991) terms localization the most striking feature of the geography of economic activity.

There are two types of localized industries. The first is characterized by increasing returns that are internal to the firm, while the second is characterized by increasing returns that are external to any single firm. Some industries are dominated by a small number of firms with production concentrated at one or a few facilities. One would expect such industries to be geographically concentrated. In the extreme case of ever-increasing returns at the plant level, one would expect to see an industry with a single-facility monopolist exhibiting maximum geographic concentration. The large commercial airframe and large jet engine industries in the United States have structures that approach this extreme.

The second, and in many ways more interesting, phenomenon is that of geographic clusters of firms in an industry. In such industries, the structure of firms influences, and is influenced by, the localization of industry. Localization leads to the development of external economies in terms of information flow, knowledge spillovers, and contacts with suppliers and buyers. Localization is often associated with low levels of vertical integration and diversification. In localized industries, geographic concentration may serve to limit the disadvantages that small firms face with respect to larger, vertically integrated firms. Localization can also facilitate the negotiation and monitoring of collusive arrangements among firms.

4.1.1 Clusters of Firms and External Economies

Firms within a geographic cluster are often able to draw advantage from their local environment. Marshall (1920, 1923) pointed out the importance of external economies that can arise from the concentration of many similar firms in the same location in the development of firms, especially in industries that require specific skills. Marshall's description of localized industries remains perhaps the most insightful in the literature.

When an industry had chosen a locality for itself, it is likely to stay there long: so great are the advantages which people following the same skilled trade get from their neighborhood to one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously. Good work is rightly appreciated, inventions and improvements in machinery, in processes and the general organization of the business have their merits promptly discussed: if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus becomes the source of further new ideas. And presently subsidiary trades grow up in the neighborhood, supplying it with implements and materials, organizing its traffic, and in many ways conducing to the economy of its material. (1920, 225)

External economies encourage the localization of production in industries characterized by limited economies of scale. Although one might expect such industries to spread over space to serve geographically dispersed customers, significant requirements for industry-specific expertise or specialized inputs

can cause clusters of firms to develop around sources of the necessary expertise and inputs. The Sassuolo-area ceramic-tile industry provides a good example. Demand for ceramic tiles is widespread, both in Italy and the rest of the world. Many other building-materials industries are geographically dispersed rather than concentrated. The efficient scale for ceramic-tile production is the single production line, which represents a small fraction (well under 1 percent) of the total market. Economies of scale in ceramic tile production are limited, but access to knowledge of the complex material transformation process and specialized suppliers (several of which operate in industries with significantly larger economies of scale than tile production) helps keep the industry localized in Sassuolo.

The evolution of clusters of suppliers, customers, and competitors is extremely important to the development of localized industries.³ The external economies that such clusters create in terms of information flow and the spread of knowledge appear to give localized firms advantages in a wide range of industries. In many cases, suppliers and equipment manufacturers work closely with their local customers to develop new and improved products. Ongoing contact between buyer and supplier promotes rapid information flow and joint efforts to solve pressing problems. Local firms often serve as test sites for new ideas, or for the optimization of inputs and equipment. In return, they tend to receive exclusive use of the ideas, inputs, and equipment, at least for a short period of time. Outsiders must often be content with older inputs and equipment. The Sassuolo ceramic-tile industry, in which many technical advances were developed through the efforts of tile firms and equipment manufacturers, provides a good example of joint problem solving. One such advance, the single-firing process, reduced the cycle time for a batch of ceramic tiles from forty-eight hours to fifty minutes (Enright and Tenti 1990). Although the new technology caught on rapidly in and around Sassuolo, it was several years before equipment embodying the new technology was sold outside the area.

4.1.2 Firm Structures in Localized Industries

Firms within a geographic cluster often exhibit lower levels of vertical integration than their dispersed counterparts. Bologna-area packaging-machinery firms, for example, subcontract out a far higher proportion of their production than their competitors both inside and outside Italy. The same is true of Sassuolo ceramic-tile manufacturers. In Prato, there is no such thing as a vertically integrated textile firm. Each company concentrates on a single stage, such as spinning, in the production process. A single wool textile can go through five or six firms before it is finished. The synthetic fabric industry in Fukui, Ishikawa, and Toyama exhibits a similar level of disintegration. There are hundreds of small firms in Solingen that perform a single step in the cutlery production

3. See, for example, Hoover and Vernon 1959; Brusco 1982; Oakey 1985; Becattini 1987, 1989; and Scott 1987, 1988a, 1988b.

process. A single product will normally pass through many craft shops before it is finished. The Piacenza-area manufacturers of factory automation equipment are among the least vertically integrated in the world. Several companies actually do no metal bending, preferring to subcontract for all component production and to concentrate on assembly and software development.

Localization can influence the vertical structure of industries in two ways. The first is through the impact of the extent of the local market on the vertical structure of firms. Stigler (1951) points out that, as an industry increases in size, firms may start to specialize in certain activities, particularly those subject to increasing returns to scale over some range of output. He concludes that localization increases the effective economic size of an industry, allows for gains from specialization, and results in lower levels of vertical integration than are seen among geographically dispersed firms. Evans (1972) predicts that functions with an optimal scale larger than that required by a single firm will tend to be performed by separate firms. Co-location of firms in a given industry allows each activity to achieve its optimal scale. Though such activities could be undertaken by one of the firms in the original industry, Evans concludes that firms will generally not wish to buy from a competitor. Thus localization results in the emergence of supplier firms and lower levels of vertical integration than would otherwise occur.

Localization can also influence the vertical structure of firms through its impact on the costs of transactions, including the costs of negotiating and monitoring contracts and the costs associated with the potential for opportunistic behavior. When suppliers and buyers are physically close together, negotiations and monitoring become less costly. This will be true if information is transmitted through personal contact, communication costs increase with distance, or if there is a degradation in communication with increased distance. In addition, some localized industries develop standardized transactions and a common language that lower the cost of negotiation. In the Prato wool textile industry and the Japanese synthetic weave industry, standard contracts have developed that reduce the time and cost of negotiation. The Hollywood motion picture industry routinized the casting of extras through Central Casting in the 1920s. More recently, area-specific guild and union contracts have standardized many of the industry's transactions.⁴ The repeated close-quarter transactions and cultural similarities often allow localized industries to develop such mechanisms even when dispersed firms do not.

Localization can also improve the effectiveness of market transactions by reducing the chances that a firm might engage in opportunistic behavior. A firm is unlikely to make an investment if its buyers or suppliers can renege on agreements after the investment is made. The more specific the investment

4. An interesting aside on the geographic concentration of the motion picture industry is that the three national officers of the Screen Actors Guild, the president, treasurer, and secretary, must reside in the Los Angeles area for the duration of their terms.

(the fewer alternative uses it has), the greater is the danger of such behavior.⁵ Geographic concentration can reduce the specificity of investments (or assets), since the presence of several local firms in an industry provides alternative transaction partners should one firm renege on its agreements. Reduction of asset specificity greatly reduces the frequency of the potential holdup problems that might force firms to integrate vertically. Geographic concentration also allows news of opportunistic behavior to spread rapidly through the industry, making it more difficult for the offending party to make further contracts, thereby increasing the costs of engaging in opportunistic behavior. Finally, localized industries often develop additional governance structures, including social as well as economic strictures, that lower the risk of opportunistic behavior and therefore the costs associated with market transactions.⁶

The net result is that geographic concentration allows for the development of vertically disintegrated structures by allowing each activity to be performed at its optimal scale, reducing the transaction costs involved in market transactions, and by supplying additional mechanisms that foster firm interdependence.

4.1.3 Incentive Structures in Localized Industries

Markets and hierarchies each have advantages and disadvantages as mechanisms to coordinate transactions. The principal advantage of markets lies in the clear incentives that they provide firms, whereas the principal disadvantage of markets lies in their inability to coordinate certain complex or difficult transactions. The principal advantage of hierarchies lies in their ability to coordinate complex or difficult transactions, whereas the principal disadvantages of hierarchies are problems of incentives and bureaucracy, such as principal-agent problems (the incentives of the principal and the agent might differ), needless intrusion by upper management, a tendency to forgive deficiencies within hierarchies (failure to hold individuals or groups responsible for outcomes reduces their incentive to give an optimal effort), and the politicization of investment and operating decisions (decisions are based on politics rather than economics) (Williamson 1985). The disintegrated structures common in many localized industries allow market, or “high-powered,” incentives to permeate the system. Firms operating in each stage of the production process face local markets that force them to be efficient and to improve their skills and capabilities continually. The structures can also increase overall industry efficiency by eliminating the incentive and bureaucratic features that limit the efficiency of hierarchical arrangements. In many instances, localized clusters of firms are able to obtain the benefits of organization through markets, though they can do so only if

5. Klein, Crawford, and Alchian (1978) link opportunism with specific assets. Williamson (1985) provides a complete treatment of the effect of specific assets on transactions.

6. dei Ottati (1987), for example, concludes that the sense of community present in Italy's industrial districts helps govern transactions within the districts. Piore and Sabel (1984) identify “social cohesion” as a factor that limits the range of behavior in industrial districts.

they develop coordination mechanisms that limit the disadvantages of the absence of hierarchy.

Other incentives also come into play in localized industries. In such industries, interpersonal and interfirm rivalry can be particularly fierce. In an environment in which industry participants know each other and the local press continually compares firms, the desire to be number one in the local industry becomes particularly acute. When Yamaha announced its intention to become the world leader in motorcycles, Honda moved quickly and decisively to meet the challenge from its local rival (both firms were from Hamamatsu).⁷ The Sassuolo-area tile companies are owned by the leading citizens of the same town. Their place in the local pecking order is determined by the position and prestige attained by their firms. The same is true in the Hollywood motion picture industry, where a quick glance at the seating arrangements at leading restaurants shows the relative positions of industry participants.⁸

The economic literature on rank order tournaments indicates that this type of behavior may have adaptive value for localized industries. Rivalry for ordinal position (rivalry to outperform other participants rather than to achieve a particular level of performance), or "playing to win," can result in greater efficiency than other forms of behavior when it is costly to monitor effort and common shocks (environmental factors that affect all participants and are beyond their control) are relatively large. The basic argument is that when common shocks are large, absolute performance levels depend more on the shock than the efforts or capabilities of the participants. In these circumstances, rewards based on absolute performance outcomes do not induce optimal levels of effort. Instead, rewards based on ordinal position can induce superior levels of effort on the part of participants. In localized industries, where common shocks are large and monitoring, by those outside the firm, is costly, "playing to win" through investment in firm capabilities can increase the efficiency of the entire cluster of firms.⁹ Thus the constant comparison among firms and the interpersonal and interfirm rivalry found in localized industries can contribute to the efficiency and competitiveness of the local industry.

Conversely, geographic concentration can also increase the level of cooperation among firms. Some forms of cooperation, such as bulk purchasing, joint

7. The president of Yamaha was forced to publicly apologize for attempting to take over the number one spot.

8. Several authors note that the interaction of economy and society within localized industries can lead to greater cooperation than would be observed among dispersed firms. The rationale is that economic activity is embedded in a larger set of social relationships that foster trust and cooperation. Less attention has been paid to the idea that social interaction can be competitive as well as cooperative and that the competitive aspects may spill over into economic behavior.

9. See Lazear and Rosen 1981; Green and Stokey 1983; and Nalebuff and Stiglitz 1983. In these papers, compensation schemes that depend on ordinal positions rather than absolute levels of output are shown to be superior (more efficient) when monitoring is costly and common shocks are large. As the number of participants increases, competition through investment in individual capabilities becomes more intense. Rewards based on ordinal positions provide the proper incentives for participants to expend effort and invest in their capabilities.

training programs, and industry-specific infrastructure investments, are often not possible when firms are dispersed. Localization can increase the political power of an industry, increasing the ability of its firms to lobby local authorities and giving it a greater voice in local affairs. Finally, the ease of communication within a geographically concentrated industry makes it easier to negotiate and monitor collusive agreements. If coordination is allowed to insulate firms from competitive pressures, however, incentives can become skewed, and the localized industry can lose its vitality. Coordination through collusion, by reducing competitive pressures, can actually reduce the pressure to coordinate productive activities effectively. Again we see that geographic concentration does not determine industry behavior, but allows for a greater range of behavior than might otherwise be observed.

4.2 Coordination of Productive Activities in Localized Industries

In general, there are a number of mechanisms that can be employed to coordinate activity within an industry, including spot markets, short-term coalitions, long-term relationships, and hierarchical organizations. The coordinating mechanisms used in a given industry will depend on production technologies, the nature of demand, the competitive environment, firm strategies, and government regulation. They will often change over time. Each coordinating mechanism employs its own set of coordinating tools and coordinating agents (see fig. 4.1). Prices and specifications are the tools used to coordinate the activities of spot markets. Spot markets require marketmakers to match supply with demand, or to take the place of the auctioneer of the neoclassical economist. Specific contracts of limited duration typically bind the members of short-term coalitions. These coalitions usually require an organizer or promoter to act as the coordinating agent. Economic or social interdependence, which is often formalized in general long-term contracts, serves to bind the members of long-term relationships. Usually, the members of such relationships are themselves the main coordinating agents. Finally, hierarchical organizations (firms) use compensation schemes to coordinate the activities of employees. The firms' managers are typically the main coordinating agents. (All the papers in this volume address one or more of these aspects of coordination.)

Simply listing the various organizational forms and coordinating mechanisms, however, does not tell us why a particular form or mechanism is used in a particular industry or situation. Only historical analysis of individual industries and firms can provide such an understanding. The following examples describe the evolution of coordination between firms in some well-known localized industries, each of which has seen dramatic change in organization and coordination in the twentieth century. Hollywood has been synonymous with the motion picture industry since the 1920s. Prato is perhaps the prototypical Italian industrial district. The watch industry has been one of Switzerland's

Coordination Mechanism	Coordinating Agents	Coordinating Tools
Spot Markets	Marketmakers	Prices, Specifications
Short-term Coalitions	Organizers	Short-term Contracts
Long-term Relationships	Partners	Interdependence
Hierarchy	Managers	Compensation

Fig. 4.1 Types of coordination

major success stories for centuries. The examples are not meant to provide a detailed explanation of why these industries are localized; I have done so elsewhere (Enright 1990). Instead, the examples take localization as a given and attempt to show the range of coordination mechanisms employed in localized industries and how these mechanisms have evolved in response to changes in products, technology, markets, competition, and government policies.

4.2.1 Coordination through Short-Term Coalitions: The Hollywood Motion Picture Industry

Hollywood, or more properly the Los Angeles area, has dominated the U.S. motion picture industry since the 1920s. In 1939, for example, Hollywood produced 90 percent of the feature-length motion pictures made in the United States and 65 percent of those produced in the world (Rosten 1970, 4). According to the Department of Commerce's census of service industries, in 1987 California accounted for 75 percent of U.S. motion picture production and 70 percent of U.S. television show production. The Los Angeles–Long Beach Primary Metropolitan Statistical Area (PMSA) accounted for 96 percent of California's motion picture and 85 percent of its television show production in that year. This translated into 71 percent of the nation's motion picture and 60 percent of the nation's television show production.

Industry History

Hollywood's rise to prominence began shortly after the turn of the century. In 1909, William Selig, a Chicago moviemaker frustrated by Chicago's weather (all movies were shot outdoors at the time) and running battles with the New York-based Motion Picture Patents Company (MPPC),¹⁰ moved his

10. The MPPC was created in 1908 to pool and control the various patents that had been awarded on motion pictures and motion picture equipment. The trust sought to enforce its monopoly on motion picture production through the courts and through strong-arm tactics. The U.S. Justice Department eventually sued the MPPC for antitrust violations. The MPPC was dissolved by the courts in 1918.

business to Los Angeles. Another company, the Nestor Film Corporation, set up the first studio in Hollywood in 1910. Within three months, there were fifteen companies shooting films in Hollywood, which was soon transformed from a sleepy residential community into the motion picture capital of the world. The movie companies were initially attracted to Hollywood by the weather, the proximity of Los Angeles (which provided infrastructure and workers), location near other film companies (which stimulated the development of specialized services and suppliers for the industry), and low land prices. Another attraction was distance from New York (and the MPPC's strong-arm tactics) and proximity to Mexico (which permitted escape beyond the jurisdiction of U.S. marshals). The physical geography of the Los Angeles area allowed film companies to find a wide range of locations, including mountains, deserts, rivers, and ocean, within a day's journey. According to Schatz (1983, 35), the forces that were to become the major Hollywood studios were in place by 1914. By 1915, the local film industry payroll was already estimated at \$15 million (Palmer 1938, 191, 198).

During the "studio era" (mid-1920s to 1949), the U.S. motion picture industry was controlled by eight corporations. The five so-called majors, Paramount, Loew's, Twentieth Century-Fox, Warner Brothers, and Radio-Keith-Orpheum (RKO), were fully integrated into production, distribution, and exhibition. Of the "little three," Universal and Columbia produced and distributed films but owned no theaters, whereas United Artists distributed films for independent producers but did no production and owned no theaters. The majors developed strategies based on creating stars, controlling distribution, and dominating exhibition through ownership of a small number of first-run theaters. This strategy allowed the majors to receive roughly 75 percent of the motion picture rental fees during the studio era. The "little three" received around 20 percent of the film rentals in the studio era; all other companies combined received around 5 percent.¹¹

Coordination of the industry's activities was carried out within the vertically integrated firms. The majors' overall production and release schedules were set by corporate management in New York. The Hollywood studio chief and a small number of producers then organized the writing, pre-production work, filming, editing, and post-production work using actors, staff writers, directors, and crews, as well as pre- and post-production workers who were under long-term contracts (the so-called contract system). The studios attempted to utilize fully their fixed production assets to supply their other, larger fixed assets in exhibition and distribution.¹² Specialized skills and rigid union work rules (by the mid- to late 1930s) meant that a large number of individuals performed

11. Although the majors dominated motion picture production during the studio era, some independent producers, such as Samuel Goldwyn and David O. Selznick, producer of *Gone with the Wind*, were able to make their way during the period.

12. According to Gomery 1986, 8, production accounted for only 5 percent of the major studios' assets in the 1940s. Distribution accounted for 1 percent and exhibition (theaters) 94 percent.

sharply defined specialized tasks for a given film (Gomery 1986, 15). Hollywood and New York negotiated over budgets, schedules, wages, and investments. Final decisions usually rested with the CEO in New York, not the studio boss in Hollywood. The physical separation of management allowed the production chief to be part of the Hollywood creative milieu while corporate remained part of the New York financial and distribution community. The separation also allowed the studio chief a certain autonomy, providing some insulation from the very different tasks of distribution and exhibition.

Under the studio system, motion picture production in Hollywood became a standardized process tightly controlled and coordinated by the studio boss. Many believe the mass production of motion pictures reached its zenith (or nadir) at MGM, under Louis B. Mayer, and Warner Brothers, under Jack Warner, in the 1930s and 1940s. Mayer, MGM studio boss from 1924 to 1947, was reportedly the highest-paid executive in the United States in the 1930s. At MGM, producers could only sign stars and initiate projects with Mayer's express approval. Warner Brothers was particularly known for its assembly-line methods of moviemaking. Jack Warner and his assistants made all the important movie production decisions, generally trying to produce large volumes of films on small budgets, reusing stories, and operating with an overworked and underpaid studio staff (Gomery 1986, 68–69, 112–15).

An antitrust suit initiated by the Justice Department against the eight largest motion picture companies in 1938 had a dramatic impact on the movie industry. In 1948, the U.S. Supreme Court found that the companies had illegally monopolized the distribution and exhibition of motion pictures.¹³ In what became known as the “Paramount Decision,” the Court ordered the firms to divest their theaters and outlawed block booking, the practice of forcing exhibitors to take blocks of films, sight unseen, in order to obtain any films at all. The decision influenced organization and coordination in the motion picture industry in two ways. The direct effect was the separation of exhibition from distribution. The indirect effect was the separation of distribution and production. The divestiture of the theaters and the end of block booking meant that each film had to be marketed individually. A studio could no longer guarantee the run of its motion pictures, or whether they would actually be run at all. Faced with greatly increased uncertainty, the Paramount defendants curtailed production (even though the Paramount decision did not force them to do so), further decreasing their level of vertical integration, and ended the contract system. Directors, writers, producers, and performers began to freelance on a picture-by-picture basis, while the “studios” focused on distribution rather than production.¹⁴

Another result was a dramatic increase in the importance of independent

13. Charges of monopolization of production were dismissed.

14. I will continue to use the term “studio” (following industry practice) to refer to the production/distribution companies.

production. In 1949, independently produced films accounted for only 20 percent of the films released by the eight Paramount defendants. United Artists, which did not produce at all, accounted for half of that 20 percent. In 1957, independent production accounted for 58 percent of the large distributors' releases, with United Artists releasing less than one-third of that 58 percent (Conant 1978, 117–18). The separation of production from distribution had unanticipated benefits. The major studios found that independent producers were able to provide films that were more creative and lower cost than in-house production, with its large overhead expenses and risk-averse formula-film tradition, indicating that there had been significant inefficiencies in the vertically integrated structure. The studios actually accelerated the process of vertical disintegration by renting studio space, distributing independent films, and investing in independent production. Warner Brothers, for example, advanced \$1.6 million to independent producers in 1946. Ten years later the figure was \$25.1 million.¹⁵

Actually, the motion picture industry had begun to change even before the Paramount decision. During the boom years of the Second World War, leading stars, directors, and producers set up production companies to take advantage of favorable corporate and capital gains tax rates.¹⁶ By the 1950s, most important stars had formed their own production companies (Gomery 1986, 9–10). Bitter but successful unionization drives in the 1930s and 1940s left Hollywood a fully unionized shop by the time of the Paramount decision. Extremely detailed work rules limited the flexibility of the studios, while wage agreements increased the integrated studios' labor expenses. Even before the decision, studios had begun efforts to reduce their fixed costs and payrolls. Paradoxically, industry-wide union contracts, which gave workers protection without the need to negotiate a detailed agreement for each film, and the roster system, in which the craft unions acted as hiring halls to allocate temporary jobs, allowed independent filmmakers to find qualified personnel without incurring search and negotiation costs. After the Paramount decision, more and more filmmakers found they could increase flexibility and decrease expenses by hiring independent contractors rather than permanent employees. The result was a further "casualization" (use of temporary workers and contractors) of motion picture employment.¹⁷

The structure of the motion picture industry was also influenced by changes in demand due to demographic changes and increased competition from television. As population shifted from city to suburb, it became more difficult to attract crowds to the large inner-city theaters that had provided the bulk of

15. Warner Brothers Annual Reports, quoted in Conant 1978, 117.

16. Some artists were able to reduce their effective tax rates from 81 percent to 60 percent by incorporating. Others were able to sell interests in motion pictures as assets and therefore qualify for the 25 percent capital gains rate in effect at the time.

17. This process has continued to the present. See Christopherson and Storper 1989; and Storper and Christopherson 1987.

movie revenues in the 1930s and 1940s. A more important phenomenon was the advent of television. In 1949, there were 1 million sets in use in the United States; by 1969, there were 84 million. The penetration of television went from 2.3 percent of American households to 95 percent of households over the period. By 1960, the average American was watching twenty-five hours of television a week (Schatz 1983, 18). U.S. motion picture admissions peaked in 1946 and fell dramatically until levelling off in the mid-1960s at less than one-third of the peak. Competition from television forced motion picture producers to find ways to differentiate their films. One result was an increased focus on large-budget, star-studded blockbuster (and would-be blockbuster) films. The focus on blockbusters was reflected in the growth in average movie production, or negative, costs. During the studio period, production costs averaged \$500,000 per movie. By 1952, the figure was \$1 million. By 1970, it was \$1.5 million. Costs rose dramatically in the 1970s and 1980s. The average production cost was \$9.4 million in 1980, and by 1992, it cost between \$40 million and \$50 million to make, distribute, and advertise a major motion picture.¹⁸ The rise of the blockbuster resulted in increased volatility in the industry. The success of a studio could now depend on the results of a single motion picture.¹⁹

Increased volatility led to the evolution of a variety of organizational forms that developed to manage or share the risks involved in motion picture production. The three principal organizational forms used for motion picture production in the early 1990s reflected this evolution. Nine major studios²⁰ still engaged in in-house production (vertical integration of production and distribution), where the studio financed the movie internally; hired producers, directors, and actors (usually to a one-picture contract); and then distributed the film through its distribution arm.²¹ A second organizational form was the fully independent production company in which an independent producer (there were literally hundreds in the industry) financed and made the picture and then attempted to sell the film to a major studio that would distribute it, in what was known as a “negative pickup deal” (an arm’s-length transaction on what was essentially a spot market).²² A third form was independent production with a studio guarantee, in which the independent producer put together a script,

18. See *The Motion Picture Almanac*, several years. Much of the increase was attributable to a dramatic increase in fees commanded by Hollywood’s leading stars. The wages of the director, writer, producer, and stars accounted for roughly 10 percent of the typical film’s budget in 1982, but 50 percent in 1992 (Stejn 1992).

19. *Cleopatra* (1963), which lost some \$18 million, nearly drove Fox into bankruptcy. Two years later *The Sound of Music*, which grossed more than \$75 million, became the most successful motion picture ever released to that point. *E.T.* (1982) cost \$12 million to make and grossed more than \$228 million in revenues. *Ishtar* (1987), on the other hand, cost \$45 million to make and grossed only \$7.5 million.

20. Buena Vista (owned by Disney), Columbia (owned by Sony), MGM/UA (owned by Credit Lyonnais), Orion, Paramount, TriStar, Twentieth Century–Fox (owned by Rupert Murdoch’s News Corporation), Universal (owned by Matsushita), and Warner Brothers (owned by Time–Warner).

21. Paramount presently makes most of its pictures in this way.

22. Producer Saul Zantz financed *Amadeus*, which he then sold to the highest bidder.

actors, director, and crew and then sold the idea to a major studio, which guaranteed that it would buy the film as long as it met certain requirements (an intermediate form of coordination). The producer then took this guarantee to a bank that extended a loan to cover production costs.²³ Variations on these organizational forms included coproduction, in which two or more studios shared production responsibilities,²⁴ and cofinancing, where studios took on outside financial partners (often foreign distributors) for films they produced in-house. Another variation was affiliated production, which involved cooperation between a studio and a large entertainment/production company to produce a feature film.²⁵

Negative pickup deals increased in importance in the late 1980s. In 1987 and 1988, the major distributors picked up more than half of the films they distributed (see table 4.1). This trend was somewhat reversed in the 1990s, as many independents faced financial difficulties or bankruptcy.²⁶ The late 1980s and early 1990s also saw an increase in multipicture deals, in which the Hollywood studios signed exclusive contracts with leading stars and filmmakers for a fixed number of films. Multipicture deals provided filmmakers and stars with financial security, while giving the studios the chance to lock up proven moneymakers for several pictures in medium-term relationships. Multipicture deals tended to be risky for the studio, since they gambled on the continued popularity and creativity of the artists.²⁷ Some of the more noteworthy multipicture deals involved Paramount and Eddie Murphy, Orion and Woody Allen, and Twentieth Century-Fox and writer-director James Cameron (of *Terminator 2* fame).²⁸ Industry sources estimated this last deal, reached in April 1992 and covering up to twelve pictures, could be worth \$500 million (Eller and Fleming 1992). Multipicture deals linked individual artists with the studio. A new short-term coalition still had to be put together for each individual film.

Coordination within the Hollywood Motion Picture Industry

Coordination mechanisms in the Hollywood motion picture industry have evolved to meet changes in the regulatory and economic environment. In the

23. Spike Lee has made all his films in this way.

24. The latter is rare, but does occur. Warner Brothers and Universal coproduced *Gorillas in the Mist*, a film for which both owned production rights.

25. There were several large entertainment/production companies, including Amblin Entertainment (owned by Stephen Spielberg) and Mal Passo (owned by Clint Eastwood). Such companies often worked with different studios on different films.

26. Independent production has been a difficult business. Roughly 40 to 50 percent of the independent productions produced in the early 1980s in the United States never received U.S. theatrical distribution. See Cohn 1991.

27. Most multipicture deals involved either cofinancing (the producer's own company agreed to raise part of the cost of making the movie, the studio agreed to pick up the rest) or equity participation (in which the artist would be paid a percentage of the gross or a portion of the profits of the films) to make sure that the interests of the studios and the artists coincided.

28. Murphy's 1991 agreement guaranteed him \$12 million a film for four films. See Wechsler 1990; Landro 1991; and Weinraub 1991b. Allen made nine pictures for Orion between 1982 and 1991 and was committed for three more until Orion's financial difficulties left them unable to finance Allen's projects. See Weinraub 1991a.

Table 4.1 In-House Production versus Acquisitions for the Major Film Distributors

Year ^a	In-House Productions	Acquired Productions	Percentage In-House
1982	52	75	41
1983	76	76	50
1984	81	75	52
1985	70	53	57
1986	67	61	52
1987	72	85	46
1988	73	82	47
1989	78	67	54
1990	90	66	58
1991	86	63	58
1992 ^b	44	31	59

Source: *Variety*, 27 April 1992.

Notes: English-language films distributed by the major distributors in the United States. Companies covered are Buena Vista, Columbia, MGM/UA, Orion, Paramount, TriStar, Twentieth Century-Fox, Universal, Warner Brothers, Triumph, and Sony Pictures Classics.

^aYear of commencement of production.

^bFirst half of year.

studio era, the studio bosses and their assistants coordinated the actual making of motion pictures in extremely hierarchical structures. The large motion picture companies used personal negotiations between a studio chief based in California with corporate management in New York to coordinate production with distribution and exhibition. Individual films were placed under the control of a producer, generally a studio employee who organized film production at the behest of the studio boss. The Paramount case had a dramatic influence on the industry structure and coordination mechanisms within the industry. The separation of production and distribution from exhibition made the integration of production and distribution far less attractive than it had been. Changes in industry economics associated with competition from television, unionization, changing demographics, and changes in the bargaining power of the various parties also contributed to the disintegration of the industry. In fact, it is highly unlikely that the vertically integrated studio system would have survived these developments even in the absence of the Paramount decision.

In the modern industry, studio projects, studio-backed independent projects, and negative pickup deals provide coordination through hierarchy, quasi markets, and spot markets respectively. Although the precise organization may differ, in each case an individual film is created through the efforts of a short-term coalition. The minimum efficient scale for movie production is the single production unit or single project. Project-based coalitions of directors, actors, crew, contractors, and subcontractors are assembled for each major motion picture (see fig. 4.2). Virtually every credit for a major motion picture represents an independent entity contracted to work on the film. Large numbers of

Story Rights Acquisition	Concepts Books Screenplays										
Pre-Production	Script Development Set Design Casting Crew Selection Costume Design Location Scouting Budget										
Principal Photography	<table border="0"> <tr> <td><u>Above the Line:</u></td> <td><u>Below the Line:</u></td> </tr> <tr> <td>Actors</td> <td>Soundstage</td> </tr> <tr> <td>Directors</td> <td>Wardrobe</td> </tr> <tr> <td>Producers</td> <td>Set Construction</td> </tr> <tr> <td>Writers</td> <td>Labor</td> </tr> </table>	<u>Above the Line:</u>	<u>Below the Line:</u>	Actors	Soundstage	Directors	Wardrobe	Producers	Set Construction	Writers	Labor
<u>Above the Line:</u>	<u>Below the Line:</u>										
Actors	Soundstage										
Directors	Wardrobe										
Producers	Set Construction										
Writers	Labor										
Post-Production	Film Editing Scoring Titles and Credits Dubbing Special Effects Sound Track										

Fig. 4.2 Production cost components for motion pictures

Source: Vogel 1990, 72.

contracts must be written for each motion picture. Even the studios' in-house production involves the hiring of many individuals and subcontractors on a one-film basis. The costs of casting, negotiations, agents' and lawyers' fees, and monitoring can account for a substantial portion of the costs of a film.²⁹

The many agreements and contracts necessary to produce a motion picture involve a huge amount of communication and an array of coordinating agents. Localization is vital for an industry whose participants are in constant communication. One industry executive estimated that he spent fifty hours a week on the phone, with roughly 80 percent of the time spent on local phone calls. Another executive stated, "In this business, it's all based on who you know—and you have to network—the agents are here and so are the writers. Everyone knows everyone. These people live, eat, and breathe the entertainment industry." In order to participate in the industry, one has to be part of the local sub-

29. Agents typically receive 10 percent of the fees paid to actors and directors; lawyers typically receive another 5 percent. Completion guarantee insurance once cost on the order of 5 percent of a movie's budget, but by 1992 cost around 1.5 percent of the production budget (Scholl 1992). The costs associated with negotiating the contracts and monitoring the production were at least 10 percent of the production budget for a typical movie in 1992. This was in addition to the search costs involved in casting and selecting a crew.

culture. Formal and informal networks have developed among the studios, directors, and local firms in the area. The motion picture community is relatively small; there are only a few dozen key decision makers. Since information flows so quickly and completely through the industry, a reputation for fair dealing is essential, and opportunistic behavior is often swiftly punished.

A bewildering number of intermediaries have emerged as coordinating agents within the industry. Producers, executive producers, talent agents, entertainment lawyers, and business affairs executives negotiate the multitude of deals that must be made for each motion picture, effectively matching supply and demand and setting prices for the services of film artists. The producer is usually the one who puts, and keeps, together the coalition required for the project. Today, a producer might be an independent filmmaker, a studio executive, a talent agent, a friend of a major star, or anyone who has access to a good story, a top director, a major studio, or a popular artist. The larger talent agencies have used their control over access to many top-name clients to become major forces in the industry.³⁰ The agencies keep constant track of ongoing and prospective deals and movies and are generally well informed about similar deals made in the recent past. Business affairs executives deal with artists, negotiate for distribution rights for finished films, and negotiate studio participation in the development and financing of in-house and independent productions on behalf of the studios. Business affairs executives frequently share information with their counterparts at other studios on a confidential basis (Brouwer and Wright 1990, 57). Information sharing on both sides has created a remarkably efficient market for motion picture talent in Hollywood.

Interfirm and interpersonal competition is a driving force in the industry. The studios compete fiercely with one another to attract talented individuals and promising projects, and to place their films at the most desirable theaters. Rivalry in the motion picture industry is highly personal. According to Rosten (1970), under the old studio system, battles between studio bosses often got in the way of potentially lucrative deals. Today, interpersonal rivalry is still intense, especially since each individual is constantly trying to find his or her next job and since each individual is considered only as good as the last film he or she was involved in. The local trade press heightens the rivalry by constantly comparing the performance of the movie companies, as well as individual actors, directors, and producers. The movie hierarchy is apparent for all in the industry to see. As was noted earlier, the seating arrangements at Spago's and other local restaurants reflect the fortunes of industry participants on an almost daily basis.

The disintegration of the studio system, which increased the number of face-to-face negotiations required to make a picture, actually resulted in an increase of geographic concentration in the industry. Christopherson and Storper (1986)

30. Michael Ovitz of Creative Artists Agency (CAA) is generally regarded as the most powerful individual in Hollywood.

measured a substantial increase in the number of firms in filmmaking services in the Los Angeles area. Given the stability of output of films during the period (1966–82), they conclude there was a substantial increase in vertical disintegration in the industry. Industry sources indicated that the trend was reversing only slightly in the 1990s as the complexity of some pre- and post-production activities (including some technically sophisticated special effects) caused the studios to bring them in-house. Even so, the number of specialized firms that serve the motion picture industry has grown dramatically in the Los Angeles area. Hollywood remains unparalleled in the availability of services (including casting and monitoring to ensure productions come in on time and on budget), contractors, subcontractors, state-of-the-art facilities, talent, and skilled craft workers for the motion picture industry. One can easily contract for services that a production company operating elsewhere would have to perform for itself. Formal and informal networks have developed among the studios, directors, and local firms in the area. These networks, combined with the contacts and reputations of individuals and the use of facilitators such as agents and lawyers, allow coordination within the motion picture industry through short-term coalitions.

4.2.2 Coordination by Entrepreneurs and Markets: The Prato Wool Textile Industry

Italy is by far the world's leading exporter of wool textiles. In 1989, for example, Italy accounted for 39 percent of world exports of wool fabrics and 46 percent of world exports of fine wool (United Nations 1991). The Italian industry is centered in three areas; the Prato area in Tuscany, the Piedmont town of Biella, and the Veneto region. Today, Prato, which is just outside of Florence, accounts for roughly 50 percent of Italian wool textile production, Biella 30 percent, and the Veneto region around 15 percent to 20 percent (Italian Wool Industry Association, private communication). The industry is even more localized than these figures suggest. Biella firms specialize in top-quality fabrics for men's clothing, whereas Prato firms generally supply medium-quality fabrics for women's wear. Prato firms account for roughly three-quarters of the medium-quality wool fabric produced in Italy.

Industry History

The Prato wool textile industry dates back at least to the early twelfth century. Local records document the operation of a fulling mill in Prato as early as 1108. Later in the twelfth century, the Bisenzio River was channeled through the city to serve local fulling mills and dyeing establishments. Prato authorities encouraged development of the textile industry by exempting from local taxes wool workers and dyers who had relocated from Verona and Lombardy. Although the different stages of textile production³¹ in Prato had once been char-

31. The principal stages in wool fabric production were and are raw material preparation, spinning, weaving, dyeing, and finishing.

acterized by independent craftsmen selling on open markets, by the fourteenth century, capitalist wool merchants (*lanaiuolo*) controlled the industry. The Prato merchants imported raw materials from Spain, Africa, and, for the finest fabrics, England, subcontracted production, and then sold the finished fabric in local and foreign markets (Origo 1986, 46–47). Individual firms that supplied the merchants were organized and coordinated under the umbrella of the local cloth guild (Arte della Lana), which dominated the various stages of textile production and sales (Origo 1986, 36). Four consuls named by the city council settled quarrels between guild members and enforced guild regulations. Cloth sales were strictly controlled by guild statutes, which governed even the selection of a supplier for a given customer (Origo 1986, 45). Although the guild system eventually dissolved, the industry retained a structure in which merchants coordinated activities within the industry, subcontracting production to homeworkers and independent craftsmen, for more than four centuries.

A modern, mechanized textile industry began to develop in Prato in the mid-nineteenth century. Shortly after the industrial revolution began in the United Kingdom, textile technology and machinery began to find their way to Prato. Giovanni Mazzoni, a graduate of the University of Pisa, combined his theoretical knowledge with the practical experience he gained in French cotton mills to open his own cotton-spinning facility in Prato in 1819. Mazzoni, who switched over to wool production in 1823–24, is credited with bringing the latest textile developments of the time to Prato (Lugonelli 1988, 8). Pratesi soon left farming in large numbers to enter the textile industry. The local sharecropping system, which operated through a series of subcontracting relationships, had helped generate a population of independent, self-reliant artisans who readily took up the textile trades. By 1846, the textile industry accounted for more than 90 percent of industrial employment in the area (Tenti 1987).

By 1862, there were twenty-seven factories in the Prato textile industry. In 1878, after a difficult period for the industry, there were twenty-eight wool textile firms with more than ten employees in the area. Prato had become a leader in recycled wool (wool made from rags and scraps) and was the leading center for the collection, sorting, and distribution of rags in Europe. Protectionist tariffs instituted in 1887 had a profound effect on the Prato industry, increasing demand for Prato's fabrics and fostering the development of new factories. The most important of the new facilities was the Kossler-Mayer factory, founded in 1888. This factory, which was owned by Austrians and employed Germans and Czechs in technical positions, was huge by Prato standards, employing 900 workers and 640 mechanical looms (Lugonelli 1988, 33). Over the next several years, this and other factories grew up alongside more traditional handicraft production.

Mechanization was accompanied by the rise of vertically integrated textile mills, mills that performed all or nearly all textile production steps internally. By the end of the 1920s, approximately 80 percent of the Prato area's twenty thousand textile workers were employed by vertically integrated mills (Triglia

1989). The industry further consolidated in the 1930s and 1940s due to large military orders³² and a focus on long production runs of standard fabrics, which were exported to less developed countries, particularly India and South Africa. At the time, the industry's requirements for coordination with the outside world were limited. Raw materials were imported from Australia through British traders. Because their fabrics were not differentiated, the Prato firms did not need to develop sophisticated marketing capabilities. Instead, British intermediaries organized the important trade of commodity fabrics to British colonies (including India and South Africa). Coordination of productive activities within the Prato industry was carried out by owners and managers within the relatively large, vertically integrated firms that continued to dominate the local industry until after the Second World War. Throughout this period, the Prato-area textile industry remained much smaller than that of Biella, which concentrated on higher-quality wool fabrics.

A boom in the Prato industry created by United Nations relief operations and the rebuilding of Europe in the immediate post-World War II period proved to be short-lived (dei Ottati 1991b). In the early 1950s, competition from low-cost producers in Third World nations, reduced military demand, the recession of the early 1950s, and increased protection in India and South Africa (which instituted import substitution programs shortly after obtaining their independence) resulted in a crisis for the Prato textile industry. Collapsing wool prices (which fell by 65 percent between March and September 1951 [dei Ottati 1991b]) put further pressure on the textile firms, which saw the value of their stocks drop precipitously. In response to the crisis, the vertically integrated Prato firms closed their factories, dismissed their workers, and sold their machinery to former employees who went into business for themselves. The result was the disintegration of the industry and the founding of a large number of small specialized firms out of the remnants of the vertically integrated mills. Subcontracting of individual steps in the production process became the principal means of regulating relations among an increasing number of ever-smaller firms (Lorenzoni 1985). This division of labor was possible because the stages of wool textile production are separable and the technology relatively well known and mature. The number of Prato-area textile firms increased from 780 in 1951 to 14,500 in 1981 and to 15,000 in 1990. The average firm size decreased from twenty-eight employees to less than four employees over the same period (Balestri 1990; industry sources).

The vertical disintegration of the Prato-area textile industry was accompanied, and in part caused, by changes in product mix. In the pre-World War II era, Prato firms tended to supply long runs of standard fabrics. After the war, the Prato industry shifted to more differentiated production, both in the fabrics themselves and the timing of the production cycle. Prato's skilled workers became masters at the flexible, rapid-turnaround, short production runs needed

32. The Italian government preferred to deal with a few firms for large military orders.

for fashion apparel and prototypes of mass market apparel. Modern technology and machinery (mostly supplied by local machinery firms) and the short production runs required for fashion apparel allowed for efficient operation at small scale. Fragmentation led to an increase in variety, which, along with the geographic concentration of the industry, reduced shopping costs for customers and attracted buyers from around the world. According to Lorenzoni (1985), potential clients knew that in Prato they could find firms willing and able to produce virtually any fabric design. Design capabilities became key to the Prato industry. By the late 1980s, Prato firms introduced some 25,000 new designs and 60,000 new patterns every six months, as older patterns were copied and produced more cheaply elsewhere. The development of new patterns and the actual production of swatches of new designs were among the most important and costly activities of the Prato firms, many of which spent an amount equal to approximately 10 percent of sales on their pattern books.

The disintegration of the textile industry was further encouraged by attitudes toward entrepreneurship that developed within the Prato area. Owning a firm and being one's own boss became a nearly universal goal, fueled in part by the example of successful entrepreneurs. Workers, technicians, and managers acted on the widespread desire for independence found in the area (Mazzonis 1985, 7). Disintegration was also encouraged, unwittingly, by government policies. Italy's artisan industry laws provided support for the purchase of new equipment by small firms, while labor legislation passed in the 1970s contributed to the fragmentation of the industry by making it difficult to operate larger firms. Restrictions on hiring and firing, indexed wages, and tight work rules hit the cyclical textile industry particularly hard. Small firms, which were exempt from some of the more onerous provisions of the labor laws, proved to be more flexible.³³ ENEA, Italy's agency for atomic and alternative energy sources, concluded that Italian labor legislation that limits the freedom to hire and fire workers in firms with fifteen or more employees discouraged the growth and limited the vertical integration of Prato textile firms. This, in turn, contributed to the flexibility and adaptability of the system as a whole (ENEA 1985, 1).

By 1990, the Prato-area wool textile industry consisted of nearly 15,000 firms employing 57,000 people.³⁴ The latter figure represented more than 50 percent of the area's employment and over one-sixth of its population. Small firms, with fewer than ten employees, accounted for 40 percent of industry employment. Firms with fewer than fifty employees accounted for some 80 percent industry employment (see table 4.2). One out of every twenty local residents owned a textile firm (Unione Industriale Pratese 1991). Most Prato firms specialized in a single stage of production. A single batch of raw material often passed through five, six, or more Prato firms on its path from raw material

33. There was a reduction in the average firm size across the Italian manufacturing sector in the 1970s and into the 1980s.

34. The second-largest employer in the area was the textile machinery industry, which employed approximately ten thousand people.

Table 4.2 Employment in the Prato Textile Industry, by Firm Size, 1990

Number of Employees	Total Industry Employment (%)
1–9	41.6
10–49	38.0
50–99	7.4
Over 100	3.3
Did not report	9.7 ^a

Source: Calculated from information provided by the Unione Industriale Pratese.

^aEstimated.

to finished textile. There were no firms that engaged in all production stages. Nonetheless, the Prato textile industry, and the Italian wool textile industry as a whole, has dramatically outperformed the industries in the rest of Europe, which were not as localized or fragmented.

Coordination within the Prato Textile Industry

Coordination within the Prato textile industry has been influenced by the requirements of the product and its production process. In textile production, the same material is processed through several consecutive and separable stages. Coordination of production involves arranging and guiding the flow of material through and between these stages.

The mechanisms used to coordinate activities within the Prato-area textile industry have evolved in response to changes in the competitive environment, technology, and product market strategies. In the Middle Ages, the industry was coordinated by guild statutes that regulated almost every aspect of the relationships within the industry and between the industry and the outside world. The wool merchants coordinated the import of raw materials, organized production, and had the exclusive right to market finished product to local and foreign customers. Though the guilds eventually dissolved, merchants continued to coordinate the production of numerous craftsmen for centuries. In the nineteenth and early twentieth centuries, industrial entrepreneurs and factory owners coordinated the bulk of Prato's productive activities, while British merchants coordinated sales to some of Prato's major markets.

The fragmented industry structure that developed in the post–World War II period required different skills, such as marketing, creativity in design, and capacity to serve new markets. The relatively high quality and rapid turnaround that became the norm in the Prato textile industry involved a substantial amount of coordination and communication to mesh productive stages. The localization of the industry facilitated the organization of a complex system where each stage of production delivered just-in-time to each subsequent stage. The disintegrated structure and the size of the local industry also led (as Stigler [1951] and Evans [1972] might suggest) to the development of a large number of firms who provided services to the textile industry, a fact that further

increased the importance of efficient flow of financial, organizational, commercial, and technical information within the district (Mazzonis 1985, 4). Brabant (1985) estimated that communication costs (including the value of the time used in communicating) in the Prato textile district was approximately 2.9 percent of total sales, or on the order of \$70 million to \$80 million each year. In comparison, sample production, one of the most important activities in the industry, often represented 10 percent of a company's sales. Of all textile-related communication originating in Prato, 54 percent was directed to others in the area, 34 percent was directed to the rest of Italy, and 12 percent was directed abroad. The vast majority of the communication within Prato took place over the telephone or in face-to-face meetings.

Information flows within the Prato industry have benefited from its localization. Virtually everyone in the Prato area is involved in the textile industry in some capacity. The industry is literally "in the air." Everyone speaks the same language, literally and figuratively. Social contacts and interpersonal networks help spread information about the industry and its firms. Standardized contracts, which reduce the information requirements for any particular transaction, have emerged. Recognizing the importance of information flow within the district, local and national authorities have cooperated in a program to develop advanced information systems and computerized ordering. Many in Prato, however, believe that information flows so freely through the area that local governmental efforts to install advanced information systems have been superfluous, and the efforts have been ignored by many Prato firms.

Today, most transactions in the Prato industry take place on spot markets. Coordination is achieved through contractual relationships and market parameters such as price, quality, timing, and reliability, rather than hierarchical authority (Lorenzoni 1985, 12). *Impannatori* have become the central coordinating agents of the Prato industry. Impannatori have occupied a unique position in the industry, supervising fabric design, finding clients, purchasing material, subcontracting production, coordinating logistics, and making final sales, often without directly controlling any production capacity.³⁵ Though impannatori existed in the pre-World War II industry, their importance grew dramatically in the postwar era with the need to coordinate the production of the new, fragmented firms. After receiving orders, impannatori subcontract productive activities on a spot basis. They tend to use many subcontractors, and each subcontractor tends to serve many customers, with the local market providing the principal coordination mechanism for firm activities. Most impannatori rotate their subcontractors periodically. Those that do not still use the presence of numerous local competitors and common knowledge of local quality and price standards to set contract parameters. This results in essentially market-mediated outcomes, even for what appear to be long-term relationships. As long as a subcontractor does not deviate from local standards of quality, or try

35. The only physical assets employed by many impannatori are their telephones.

to charge above the going price for a service, there is no reason to change subcontractors.

By 1990, there were approximately six hundred *impannatori* active in the Prato area. The *impannatori* have become the marketmakers of the Prato system, matching supply within the Prato area with demand, from Italy and from abroad. According to Becattini (1990, 42–43), the *impannatori* are “pure entrepreneurs” whose major function is to translate the capabilities of the district into products that can be sold on world markets. The *impannatori* coordinate activities within the district. They also coordinate the activities of the district with the outside world, obtaining information on improved machinery, new processes, and markets wherever it is available. As a result, the Prato system has been able to keep abreast of the most modern technology as it competes on the basis of quality, design, reliability, continuity of supplies, and punctual delivery (Mazzonis 1985, 5).

Despite their efficiency, Prato’s spot markets cannot deal effectively with all contingencies, especially when capacity is constrained. Large rush orders sometimes strain the system. In such cases, firms may simply pay their subcontractors more to expedite their orders. In other instances, interpersonal and family ties provide a “market override” mechanism that allows the orders to be filled, while other, less important orders are slightly delayed. Implicit is the understanding that the debt will eventually be repaid, either in future business or in special contract terms.³⁶ Some of the larger Prato firms have invested in weaving and finishing firms in order to ensure rapid turnaround on special orders for large customers. These relationships augment rather than replace the spot market in the Prato system. Although most transactions take place on what may be described as a spot market, increases in equity cross-holdings show that the spot market is not adequate for all the district’s transactions.

The organization of the Prato textile industry has evolved in response to changes in technology, market demands, government regulations, and competition from outside the district. Vertical disintegration created substantial needs for coordination among specialist firms. Mechanisms that have arisen to coordinate activities within the Prato district have allowed the district to gain the benefits of a vertically disintegrated structure, while mitigating its disadvantages. Geographic concentration offers reduced transaction costs through lower communication and transportation costs. Standardized contracts reduce

36. Lorenzoni (1985) states that understanding and trust in the capabilities of others in the district and the recognition of the need for mutual adjustment is characteristic of the Prato industry. dei Ottati (1987) emphasizes that cooperation between the district’s buyers and suppliers aids in the coordination within the Prato industry. Trust has its limits in the Prato system, however. Prato firms frequently spread disinformation in an attempt to gain advantage. Prato weavers, for example, often make inflated demand projections to induce spinners to increase capacity, thus improving the weavers’ bargaining position. A recent agreement among Prato spinners to hold the line on prices fell apart almost instantly as firms began to undercut each other. Jockeying for position through the selective use of disinformation is an acknowledged practice in the Prato industry.

negotiating costs. Social relationships recognize the interdependence of firms and promote cooperation between vertical stages of production, while fierce competition within each stage wrings inefficiency out of the system and forces firms to upgrade their expertise and equipment. The presence of hundreds of firms at each stage in the production process ensures essentially perfect competition at each stage of the process. According to ENEA (1985, 2), "The essence of the Prato system is competitive development." The types of imitation and innovation described by Marshall flourish. Interfirm and interpersonal rivalry within the district heightens the level of competition.³⁷ Even with such tough competition, the repeated nature of firm interactions, the importance of reputation in obtaining orders, and rapid information flow among industry participants preclude overtly opportunistic behavior.

Overall, the results have been impressive. The Prato system has proven better able to change from the production of commodities to the production of differentiated products than the textile industries in other European nations, which are not as localized or fragmented. The specifics of wool textile production, particularly the separability of productive stages, and the segments served by the Prato industry, particularly fashion-related segments, have been amenable to the fragmented structure of the Prato industry.³⁸ Prato firms remain unmatched in their ability to turn out short production runs of a wide variety of fabrics on short notice, making them ideal for the fashion-related segments of the garment industry, with their short seasons and production runs. In the process, the Prato area has become one of the most prosperous areas in Italy and indeed in Western Europe.

4.2.3 Coordination through Cartels and Consolidation: The Swiss Watch Industry

In 1991, Switzerland accounted for 15 percent of worldwide production of watches by unit volume, but 52.8 percent of the value (7.4 billion francs out of 14.0 billion) of world production. Japan, in contrast accounted for 46.6 percent of unit production and 25.6 percent of production by value. Hong Kong was the third leading producer, with a 20.5 percent unit production share and an 8.6 percent value share. Switzerland accounted for 55.3 percent of world exports (by value) of watches (Fédération de l'industrie horlogère suisse FH, private communication). The watch industry was concentrated in seven of Switzerland's twenty-six cantons and half cantons. These seven cantons accounted for 89.8 percent of the total employment in the Swiss watch industry in 1991 (see table 4.3). The low- and medium-priced watch firms were located throughout the Jura mountains in western Switzerland from Geneva to Schaff-

37. Prato's entrepreneurs compete for business and also for position in the local society. The leading entrepreneurs are also the town's leading citizens. One Prato industrialist recently commissioned a poll to determine his standing in local public opinion.

38. It is interesting to note that Italy has been internationally successful (with fragmented structures) in other industries with similar attributes, such as footwear, apparel, leather goods, and even some machinery industries.

Table 4.3 Employment in the Swiss Watch Industry, by Canton, 1991

Canton	Watch Industry Employment	Percentage of Swiss Watch Employment
Neuchâtel	9,080	27.5
Bern	6,158	18.7
Geneva	5,024	15.2
Solothurn	3,593	10.9
Jura	2,928	8.9
Vaud	1,880	5.7
Basel-Land	960	2.8
Seven-canton total	29,623	89.8

Source: *Revue FH*, 27 August 1992, 1.

hausen, whereas the luxury-watch producers were mostly located in Geneva, La Vallée de Joux, and Schaffhausen.

Industry History

The Swiss watch industry began in Geneva, whose jewelry makers and goldsmiths were known for their artistic flair and knowledge of metallurgy throughout the Middle Ages. The local gold and jewelry industries, however, declined sharply in 1541 when John Calvin issued his famous edicts against luxury, pleasure, elegant clothing, and “useless” jewelry. Calvin’s edicts and a more detailed set of city regulations enacted twenty-five years later nearly put an end to the jewelry and goldsmithing industries in Geneva. At roughly the same time, Huguenots fleeing religious persecution in France, Italy, and Flanders arrived in the Swiss cantons. Among the refugees were a number of people who had been important watchmakers in their home countries. The smiths and jewelers of Geneva began to make watches and clocks under the tutelage of the refugees in order to escape the ban on “useless” jewelry. The world’s first watchmaking guild was founded in Geneva in 1601, and by 1700 there were already some five hundred watchmakers in the city. Genevan craftsmen elevated watchmaking to an art form, with watches that were soon known throughout the world.

The Geneva industry developed a fragmented production process and extreme division of labor in what became known as the *établissage* system. Cardinal (1989) identifies approximately thirty specialized trades involved in the production of watches and clocks in Geneva at the end of the eighteenth century. Each trade supplied a particular component (such as watch springs, chains, and dials) or performed a particular operation (such as movement assembly, engraving, and watchcase gilding). Production within each trade took place in small workshops in which a few workers were directed by a master craftsman. *Établisseurs* coordinated production through a putting-out system and took charge of distribution and sales. This system encouraged the development of specialized skills critical to the production of precision components

and watches. Cardinal concludes that this division of labor and coordination by the *établisseurs* “ensured the success of Genevan watchmakers” (1989, 57).

Watch production spread from Geneva to the Jura area in the latter portion of the seventeenth century. Daniel-Jean Richard and his family were said to have introduced the *établissage* system to the Jura, where watchmaking provided much needed employment in an area with long winters and limited agricultural potential. By Richard’s death in 1741, hundreds, and later thousands, of artisans made individual watch components, which were assembled in workshops located in nearby towns, such as Neuchâtel, Bienne, and Solothurn. Entrepreneurs from these towns organized production and marketed the watches throughout Europe. The local industry grew dramatically; watch industry employment in Neuchâtel grew from 464 in 1752 to more than 2,000 in 1778 (Schweizer 1986 and sources within). Individual towns or valleys came to specialize in particular components or even in watches for specific end markets. An 1818 essay claimed that the advantage of the Jura region in watchmaking came from the “orderly coordination of the various work processes” (quoted in Landes 1983, 263). Cardinal agreed, concluding that the rise of the Jura watch industry depended on extreme division of labor and coordination by the *établisseurs* (1989, 60). The Swiss watchmaking towns had also begun to invest in education and training, setting up associations to promote the development of new designs and technology, while annual accuracy trials and invention contests spurred innovation in the industry (Schweizer 1986; Landes 1983).

By 1790, annual production of watches in the Jura reached approximately fifty thousand units. By 1817, the figure had doubled. The center of gravity of the Swiss watch industry had moved from Geneva to the Jura (which included the cantons of Neuchâtel, Solothurn, Vaud, and Jura as well as part of Bern). In 1790, six of Switzerland’s cantons accounted for 92.1 percent of the industry’s employment of 39,336 watchworkers. By 1820, employment in the watch industry had grown to 62,844. The leading cantons in terms of employment in 1790 were Neuchâtel with 34.8 percent of the nation’s watchworkers, Bern with 37.4 percent, Vaud with 9.2 percent, and Geneva with 8.2 percent. By 1820, the six cantons accounted for 94.9 percent of Swiss watch industry employment, with Bern (41.5 percent), Neuchâtel (30.2 percent), Solothurn (10.1 percent), Geneva (5.4 percent), and Vaud (5.3 percent) as the leaders.³⁹

Production methods for watches began to change in the nineteenth century. In the 1830s, machinery to make gears was introduced to the Swiss watch industry. Soon the Swiss developed machine tools to make parts precise enough to be used interchangeably. At first, these tools were used by homeworkers to improve precision and productivity. Eventually, the watchmakers began to group machine tools and workers together in a search for further efficiency gains. Between 1870 and 1910, the organization of the Swiss watch industry shifted as factory production began to replace homework. By 1905,

39. Calculated from Landes 1983, 380 and sources cited within.

there were thirty-eight thousand factory workers and twelve thousand home-workers in the Swiss industry. For the first time, substantial investments in fixed assets (watchmaking equipment and machinery) were required to compete. Even though component production became mechanized, watch assembly in the Jura continued to be dominated by small firms (Knickerbocker 1972). In contrast, several leading luxury-watch manufacturers founded in or around Geneva in the eighteenth and nineteenth centuries were more integrated than their Jura counterparts, producing intricate hand-made movements for their watches.⁴⁰ These firms vertically integrated in order to achieve total control in the production of complicated watches and movements that could sometimes take years to complete.

In the 1920s, in response to falling sales and rising unemployment during the post-World War I recession, Swiss watch companies organized themselves into several associations. Watch assemblers and vertically integrated watchmakers, the companies that sold completed watches to end markets, founded the *Fédération suisse des associations de fabricants d'horlogerie* FH in 1924. Seventeen *ébauche* (unfinished watch movement) makers were organized into a trust, *Ébauches SA*, in 1926. Component suppliers grouped together to form the *Union des branches annexes de l'horlogerie* (UBAH), an association with eighteen separate subgroups for producers of different types of components, in 1926. In 1928, the associations reached a series of cartel agreements that controlled manufacturing, pricing, and exporting within the Swiss watch industry (Knickerbocker 1972, 7).

The depression of the 1930s and deteriorating conditions in the industry created an unemployment problem in the watchmaking regions that prompted intervention by the Swiss federal government. In 1931, the government invested in a holding company, the *Société générale de l'horlogerie suisse SA* (commonly known as ASUAG, the acronym of the German form of its name, *Allgemeine schweizerische Uhrenindustrie*), which in turn acquired the majority of the shares of *Ébauches SA* and several leading component and watch manufacturers. In 1934, a federal statute ratified the industry's private controls and imposed new ones. FH members were allowed to make and sell finished watches. *Ébauches SA* was granted a monopoly on *ébauche* production, except for vertically integrated firms, which were allowed to manufacture *ébauches* for internal use, but was forbidden to make or sell finished watches. FH members could buy components only from *Ébauches SA* or from UBAH (both of which could only supply FH members) unless parts of comparable quality were available from foreign sources at prices 20 percent less than Swiss prices. UBAH and *Ébauches SA* sold components at specified prices that could be changed only through interassociation negotiations. FH members were forbid-

40. Leading firms founded in the period included Blancpain and Vacheron Constantin (founded in the eighteenth century), Jaeger-Le Coultre (1833), Patek Philippe (1839), Audemars Piguet (1875), and Rolex (1878).

den to price watches below a floor price determined by adding component costs, a standard manufacturing cost, and a 23 percent margin. FH firms also agreed to reduce nonprice competition by limiting guarantees to one year on finished watches (Bregel and Rugo 1961).

The Swiss government enforced industry price agreements and attempted to protect watchmaking skills and secrets. Government permits were required to manufacture and export finished watches, movements, and components. All mergers, acquisitions, and new plant construction required government approval, as did exports of watchmaking machinery, tools, and designs for watchmaking, a move that effectively froze the structure of the industry (Knickerbocker 1972, 8). The 1934 law gave the associations, with government backing, control over the industry. Several new associations eventually formed. The *Chambre suisse de l'horlogerie* (Swiss watch chamber) represented the entire industry in international trade matters and in the administration of federal legislation. In addition to the *Chambre suisse de l'horlogerie*, FH, UBAH, and *Ébauches SA*, were the *Association d'industries suisses de la montre* Roskopf, a group of manufacturers of inexpensive pin-lever watches; the *Délégations réunies* (DR), which exercised general control over the industry's collective agreements; and the *Convention patronale*, the employers' organization that negotiated and administered agreements governing wages and working conditions with employees.

At first, the cartel proved successful. The industry prospered as demand rose in the 1930s and 1940s,⁴¹ and in the immediate postwar period, Swiss firms held an estimated 80 percent share of the world watch market. In the 1950s, however, the system started to break down. The fragmented structure hindered the adoption of the newest production techniques. Jura firms found it difficult to standardize parts or make the investments required to automate production. Some FH members began to complain that the arrangements protected marginal assemblers, fostered inefficiency among the component producers, and resulted in a deterioration of the Swiss quality image. In 1957, the resignation of seventy-two watch assemblers from the FH prompted the appointment of a government-sponsored commission to investigate their complaints. In 1959, after several months of intensive discussions, a number of changes were made in the rules governing the watch industry. FH firms were allowed to use their own production costs rather than a standard cost in determining prices, but still had to add a 23 percent margin. *Ébauches SA* prices could be appealed to a joint FH-*Ébauches SA* commission, while UBAH prices were now negotiated individually. FH members were given the right to purchase foreign parts of "acceptable quality" if (after tariff) they were 13 percent, rather than 20 percent, cheaper than Swiss parts. Integrated manufacturers were allowed to sell *ébauches* to each other, provided that they did not sell more than 60 percent of their output or purchase more than 60 percent of their total needs from other

41. Swiss firms were able to supply both sides during the Second World War.

integrated producers. This change allowed integrated manufacturers to achieve some economies of scale in *ébauche* production (Bregel and Rugo 1961).

In 1961, the cartel law was repealed altogether. As of 1 January 1966, Swiss firms were free to expand, contract, merge, sell out to foreigners, or buy foreign companies. A watch standards committee was set up to ensure quality and maintain the reputation of the Swiss industry. The fixed-price system was abolished in 1966, and export permit requirements were phased out in 1971. The repeal of the cartel law changed the face of the Swiss watch industry. In the early 1960s, there were approximately 650 watch assemblers in Switzerland, 17 manufacturers of *ébauches* (all members of *Ébauches SA*), 650 manufacturers of special parts, and 500 other firms performing miscellaneous functions. Three groups, *Fabriques d'assortiments réunies SA* (escapement mechanisms), *Fabriques de balanciers SA* (balance wheels), and *Groupements des fabricants suisses de spiraux* (hairsprings), along with *Ébauches SA* supplied roughly three-quarters of the Swiss industry's requirements for *ébauches* and separate parts. By 1971, after a series of mergers, eight watchmaking firms accounted for almost three-quarters of all Swiss watch exports. In the same year, ASUAG, the trust that controlled a majority interest in *Ébauches SA* and the three largest component companies, combined seven watch brands into a single firm. The result was a direct link between companies that assembled and marketed watches with each other and with the component manufacturing sector (Knickerbocker 1972, 11–12).

The mergers, however, did not lead to changes in the underlying industry structure. Patterns that emerged in the cartel days, when the “Swiss made” trademark meant unrivalled precision, persisted. There was little coordination among the various entities that existed under ASUAG and the other major holding company, *Société suisse pour l'industrie horlogère (SSIH)*.⁴² Neither holding company had the power to enforce coordination among the different brands and suppliers. Limited production quantities resulted in inefficient production and limited planning.⁴³ Although quality remained high, coordination among firms was poor. There were no standard orders, parts often had to be redone, and orders were often late. The holding company structure had allowed for the injection of capital from the government (which was unwilling to deal with the individual companies directly) and the large Swiss banks, but had not resulted in professional managerial control.

Industry politics prevented the holding companies from acting against the old-line watch families, or “watch barons,” who retained control but did not push for increased efficiency. Several of the families had acquired the “right” (tradition more than right) to have family members employed by the holding

42. The SSIH was founded in 1930. By 1980, SSIH included brands like Tissot and Omega.

43. The *établisseurs* tended to design watches that would require custom components. The result was lots that were often too small to justify the cost of tooling and dies. The specificity of tooling and dies often left assemblers at the mercy of individual suppliers.

company. The prerogatives of each entity were respected; no rationalization took place. There were still seventeen *ébauche* factories in the late 1970s, for example, with overlapping product ranges and strategies that remained for the most part uncoordinated (Wilhelm Hill and Urs Bumbacher, private communication). The mergers, in fact, represented an attempt to save the old structure, which had prevented market incentives from permeating the system of assemblers and suppliers. The result was that the industry had neither the efficiency of a vibrant disintegrated structure, nor the coordination advantages of hierarchy. Effective coordination at the level of production had largely ceased to exist. The fact that the system persisted as long as it did was a monument to the magnitude of the lead the Swiss industry had developed against outside competitors. Eventually, the rents that the system was devised to distribute, and that had allowed the system to persist, vanished.

The Swiss share of the world market decreased from 80 percent to around 40 percent by the end of the 1960s. Bulova, which became successful in the 1960s with the tuning-fork watch (developed by Swiss engineer Max Hertzels), and Timex, which sold more units than any other watch company in the world in 1970, had become important competitors. Despite losses in market share, growing demand kept capacity utilization and profits high in the Swiss industry. Prosperity disappeared, however, with the advent of the quartz watch in the mid-1970s. According to Bumbacher (1992), after reaching a new peak in sales of mechanical watches and movements in 1974, the Swiss watch industry virtually collapsed. Swiss firms rejected the quartz watch movement (which had actually been developed in Switzerland) because they felt it was unreliable, unsophisticated, and not consistent with Swiss standards. In addition, there was a fear that scale-intensive quartz technology would ruin the traditional fragmented industry structure and force many firms out of business. Vertically integrated foreign competitors had no such qualms. Seiko and Citizen (Japan) switched to quartz technology quickly and were soon followed by new competitors such as Casio (Japan) and Texas Instruments. Quartz technology underwent rapid improvement. Soon quartz watches exceeded the accuracy and reliability of mechanical movements by a wide margin. New entry, aggressive expansion, oversupply, and aggressive pricing caused industry prices and profits to plummet. Swiss watch output fell drastically (see table 4.4). By 1980, the Swiss had lost their position in low-priced and medium-priced watches, mostly to Seiko and Casio (Bumbacher 1992, 18). Total employment in the Swiss watch industry fell from 89,448 in 1970 to 46,998 in 1980, and would fall to 32,253 by 1990. The Jura area was faced with an economic crisis.

The need for a major restructuring of the Swiss watch industry became apparent. The restructuring was led by the large Swiss banks,⁴⁴ federal and local governments, and a management team recruited from outside the industry. The losses of the late 1970s and early 1980s meant that the banks and governments

44. The large Swiss banks wrote off hundreds of millions of francs during the reorganization.

Table 4.4 Growth Rates in Watch and Watch-Movement Production

Year	Switzerland (%)	Worldwide (%)
1970	2.8	
1971	-1.8	
1972	8.1	
1973	8.9	9.1
1974	4.3	6.8
1975	-20.2	-0.9
1976	-1.7	3.2
1977	1.7	14.2
1978	-3.5	4.3
1979	-12.4	3.0
1980	21.0	8.7
1981	-13.3	7.7
1982	-36.9	11.5
1983	-6.4	5.8

Source: Fédération de l'industrie horlogère suisse.

held control of the industry. The watch barons had seen their equity dissolve and were no longer a major factor. SSIH and ASUAG were joined to form the Société suisse de microélectronique et d'horlogerie SA (SMH) in 1983.⁴⁵ The formation of SMH involved substantial organizational and managerial changes. A controlling interest in SMH was sold to new CEO Nicholas Hayek and a friendly group of Swiss investors. By the end of 1985, the bulk of the share capital was held outside the banking industry. SMH management took active control, rationalizing and modernizing production, reorganizing the firm's activities, and breaking down the barriers that had existed between subsidiaries. Production schedules were streamlined and coordinated, as were design and marketing strategies. Finance, control, and production were managed centrally, while marketing for each SMH brand was managed separately but coordinated through an SMH management committee (SMH controlled the Swatch, Rado, Certina, Omega, Tissot, Longines, ETA, Hamilton, Blancpain, F. Piguet, Mido, and Flik Flak brands).

SMH was far more vertically integrated than either of its predecessors had been (and as or even more vertically integrated than its foreign competitors), controlling subsidiaries that supplied movements, electronic components, specialized integrated circuits, batteries, quartz oscillators, specialized materials, specialized machine tools, manufacturing systems, and distribution services. SMH's vertical integration ensured that it would not have to rely on its foreign competitors for key components. In 1983, for example, SMH founded EM Microélectronique Marin SA to reduce its dependence on Japanese suppliers of specialized integrated circuits. Vertical integration was accompanied by in-

45. The following paragraphs on SMH are based on interviews by the author.

creased differentiation of SMH's products as the company repositioned its lines to give them a clear identity. Tissot, for example, became identified with watches made from natural materials such as rock and wood as well as special designs such as the two-timer, while Rado became known for futuristic designs and space-age materials. The new hierarchical organization was able to coordinate marketing programs in a way the old holding company structure could not.

The new organization allowed SMH management to rethink the function and production of the watch, something that could not be done in the vertically disintegrated structure. The result was the Swatch, a revolutionary concept for the low- and medium-priced watch segment. The Swatch, with its distinctive designs produced in limited series with new models every six months, turned the low-priced watch into a fashion accessory. By 1991, more than 100 million Swatches had been sold. SMH had become the largest watch company in the world, accounting for approximately a third of the output (sales) of the Swiss watch industry, a quarter of its employment, and roughly three-quarters of its value added. SMH had come to dominate the low- and medium-priced segments of the Swiss watch industry and, with its Omega and Longines brands, had become the world's second leading supplier of luxury watches. Only Rolex had greater sales in this latter category.

Despite the great importance of SMH, there are several other firms in the Swiss watch industry representing different organizational forms. Switzerland's luxury-watch companies, which are mostly found in the Geneva area, have been virtually unchallenged by foreign competitors for more than two hundred years. In the early 1990s, Swiss firms accounted for approximately 85 percent of sales of luxury watches (Fédération de l'industrie horlogère suisse FH, private communication). Although several of the luxury-watch companies use quartz movements, others continue to produce handcrafted mechanical masterpieces. Some of these firms act as pure assemblers, relying on a large number of small shops for virtually all components. Rolex produces many of its own components in-house, but relies on a single supplier (which for the most part only supplies Rolex) for its watch movements. This supplier, in turn, purchases key components from SMH. Several other luxury-watch producers make their own movements. Jaeger-Le Coultre SA, probably the most vertically integrated Swiss firm other than SMH, produces its own movements and most of its own components, but relies on independent suppliers for certain specialized components such as hands, dials, and crystals.

The role of the main industry associations also underwent a dramatic change. In 1983, the *Chambre suisse de l'horlogerie* and the *Fédération horlogère suisse FH* merged to form the present *Fédération de l'industrie horlogère suisse FH*. The new association's primary tasks were to promote the Swiss watch industry, to ensure foreign markets remained open to Swiss watches, to obtain and disseminate information on the industry, to fight the counterfeiting of well-known Swiss brands, and to protect the "Swiss made" trademark. The association no longer played a role in fixing prices for watches and compo-

nents. The association's foreign repair shops were turned over to the watch companies.

Coordination in the Swiss Watch Industry

As in the Prato textile industry, coordination requirements in the Swiss watch industry have depended on the nature of the product. Watches are complex products that contain between fifty and several hundred parts that must fit and work together with extreme precision. Coordination of production involves managing the design of the watch, the specification and fabrication of components, watch assembly, and scheduling each part of the process. This gives rise to a substantially more complex coordination task than that found in the textile industry.

In the early days of the Swiss watch industry, *établisseurs* organized production of components and assembly of watches, dealing with dozens of homeworkers and small shops to coordinate the activities of the industry. The *établissage* structure that developed first in Geneva and then in the Jura was closely linked to the geographic concentration of the watch industry within Switzerland. The structure, with its market-mediated price and quality standards, provided flexibility and variety in its early days, and was retained in the Jura area even as component production became mechanized. The early *établissage* system allowed the Swiss watch industry to take advantage of extreme division of labor by providing a means of coordinating the activities of hundreds and then thousands of craftsmen. This system allowed the Swiss watch industry to attain and maintain its position of world leadership for more than two centuries.

The importance of the watch industry to local economies, fear of outside competition, and the cooperation inherent in the system helped lead to the formation of a cartel. From the 1920s through the 1960s, the activities of the Swiss watch firms were coordinated by negotiations within and among associations of firms. The associations regulated competition, arbitrated differences among members, and spoke for the industry in its relations with government (Bregel and Rugo 1961, 12). The geographic concentration of the industry allowed the firms to negotiate and monitor tightly the collusive arrangements. Proximity and interdependence had drawn the watch firms together. Information about the industry, and in particular about attempts to deviate from industry norms, traveled quickly through the watchmaking portion of northwestern Switzerland, though little information was shared with those outside the area. Geographic concentration also prompted government intervention, as the Swiss government hoped its actions would improve employment prospects in an area that relied heavily on the watch industry. In freezing industry structure, the agreements ensured that watch production in the Jura area would remain fragmented.

Inefficient firms and organizations were protected by fixed-price arrangements. Changes in the Swiss industry had to be negotiated by the associations.

This combination of circumstances reduced incentives to innovate and reduced the chance that innovations would be adopted. The industry's responses to changes in markets and technology slowed. Over time, the Swiss industry lost much of its dynamism as coordination was carried out more through a local political process than through markets or hierarchies. The fundamental structure of watch production in much of the Swiss industry, batch assembly of mechanical components, became obsolete for low- and medium-priced watches. The Jura-area watch industry was especially affected. Its fragmented structure prevented the development of scale and unity of purpose required to rationalize production or make the large investments necessary to introduce plastics and quartz movements. In addition, the Swiss system limited the incentive to improve and innovate. Ironically, the very effectiveness of this form of coordination within the cartel prevented competitive forces from making the Swiss firms adjust to changes in the product, technology, demand, and competition until it was almost too late.

Only with the advent of SMH, a centralized, vertically integrated firm, did Switzerland regain a strong position in the low- and medium-priced watch segment. SMH's activities were coordinated through its hierarchical corporate structure; CEO and principal shareholder Nicholas Hayek remained involved in all major business decisions. The formation of SMH was the response of the system to changes that had been going on in the industry for decades. The geographic concentration of the industry again played a role. The watch industry was so important to the economy of northwestern Switzerland that abandoning the industry was unthinkable. Coordination through much of the Swiss watch industry had passed from markets, to cartels, to modern corporate management.

4.3 Conclusions

Geographic concentration, or localization, in industry is a widespread and complex phenomenon. There is a close relationship between localization and the structure of firms and industries. Geographic concentration within an industry may influence the boundaries between firms by increasing the efficiency and effectiveness of coordination across firms. It reduces the transaction costs associated with spot markets and the formation of short-term coalitions based on a nexus of contracts by reducing the costs of negotiations as well as reducing the likelihood of ex post opportunistic behavior. Finally, geographic concentration can also foster the formation of cartels by making the arrangements easier to monitor and enforce. Localized industries therefore provide a unique opportunity to examine coordination within and among firms.

The organizational forms and coordinating mechanisms employed by the industries profiled have shifted with changes in product, technology, markets, competition, and government actions. The interaction is complex; it is difficult to determine one-way causation. It appears that the competitive environment,

technology, product market strategy, industry structure, and optimal coordination mechanisms are jointly determined. Each motion picture is a unique project that brings together a multitude of parties. Textiles are produced in a number of separable stages. Watches are complex products that contain many parts that must fit together with extreme precision. The nature of the product creates particular coordination requirements that influence coordination mechanisms. The greater complexity of coordination in the watch compared to the textile industry helps explain why the Swiss watch industry vertically integrated and the Prato textile industry disintegrated. The formation of cartels and associations that froze the structure of the Swiss watch industry, however, delayed this integration until the rents that propped up the system were no longer available. In Hollywood, the temporary nature of each project has fostered a certain amount of disintegration.

Changes in the external competitive environment provided a stimulus for changes in organization and coordination in the industries described. The loss of markets due to protection and greatly increased competition from the Far East reduced the viability of long production runs of low-quality wool fabrics in Prato. The Swiss watch industry was forced to restructure in the 1980s by competition from American and Asian competitors. Competition from television forced the Hollywood motion picture industry to try to differentiate motion pictures from television shows through the creation of the big-budget blockbuster film. Although each of the three industries has shown an ability to change from within, external competitive pressure figured prominently in the most dramatic of the changes in organization and coordination in each industry.

The evolution of firm strategy also influenced organization and coordination. Changes in the degree of vertical integration were associated with the development of greater levels of product differentiation in each of the three industries profiled. In Hollywood and Prato, increased differentiation was accompanied by a decrease in levels of vertical integration, whereas in the low-priced segment of the Swiss watch industry, increased differentiation was associated with an increase in vertical integration. In the first two cases, a disintegrated structure has proven better able to generate variety and flexibility. In the third, it took a vertically integrated firm to develop and carry out a strategy that brought fashion to low-priced watches. The main difference is that in textiles and motion pictures variety is linked to a production process with limited economies of scale, at least for the segments served by Prato and Hollywood, while the Swatch process is scale intensive, but permits flexibility in colors and styles around a limited number of base designs.

Government policies have influenced organization and coordination in the three industries. Antitrust enforcement unleashed a chain of events that dramatically influenced the structure of the Hollywood motion picture industry. The Swiss government codified and supported the Swiss watch cartel. Italy's artisan-firm laws favored the formation of small disintegrated firms. The indus-

try examples also show that government action has had unforeseen consequences. The Paramount decision forced the studios to divest their theaters, but it was the uncertainty that this divestiture entailed, not the decision itself, that caused the studios to separate production and distribution. Italy's restrictive labor laws accelerated the process of disintegration in the Prato industry by making it difficult for large firms to operate in a cyclical industry. The Swiss government's efforts to support the watch cartel eventually contributed to the ossification of the industry.

The examples show that there is no single natural progression through which industries develop. While portions of the Swiss watch industry eventually consolidated into a vertically integrated managerial firm, the Prato textile industry and the Hollywood motion picture industry did just the opposite. The examples also show that geographic concentration does not in and of itself determine the boundaries of firms, but may allow for a range of productive organizations and a fluidity between organizational forms. Competing organizational forms and coordination mechanisms have coexisted in the three industries. In Prato, for example, fragmented production organized by *impannatori* existed even when the industry was dominated by vertically integrated firms. Today, however, there are no vertically integrated textile firms in the Prato wool textile industry. There were vertically integrated Swiss watch firms in the low- and medium-priced segments in the days when assemblers and fragmented production were dominant. Today, however, the importance of fragmented production processes in the Swiss watch industry has diminished. There were some important independent producers in Hollywood's studio era. Today, independent and studio production coexist. The persistence of competing organizational forms may be related to the selection environment faced within the industry. The textile and watch industries have provided particularly tough selection environments for alternative organizational forms, whereas the uncertainty inherent in the motion picture industry contributed to the persistence of alternative organizational forms.

Different organizational forms appear to have different abilities to foster or react to innovation. Fragmented structures appear to be quite flexible and adaptable to incremental innovation and change, such as changes in fashion, that do not require the rethinking of the entire product or production process. Fragmented structures on the other hand may not allow for the rethinking of an entire product and process. Small producers that focus on a single stage of production will not work on developments that eliminate their stage. Companies in other stages may not have the inclination or money to do so. The development of the decentralized structure of the Prato textile industry was accompanied by innovations and changes in marketing, but did not involve substantial changes in production processes. The Hollywood motion picture industry has seen technological and market changes, but has not had to rethink the entire production process. The advent of the quartz watch movement, on the other hand, required a dramatic reappraisal of the entire process of watch manufac-

ture. The fragmented, collusive structure of the industry made it difficult to adapt to new circumstances. The Swiss watch firms proved too shortsighted to adopt the quartz movement until it was almost too late. Only a dramatic and painful restructuring, led by management from outside the industry, allowed the Swiss to regain a strong position in the low- and medium-priced segments of the watch industry. A group of localized firms may go into decline if the firms become ossified and too inwardly focused, and lose sight of their competitors and markets. This should serve as a warning to those that would view geographic clusters of small firms as a panacea for the problems of economic development.

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Comment Kenneth L. Sokoloff

Over the past decade, there has been a welcome revival of interest in the integration of geographic variables into economic analysis. Several developments have contributed to this now unmistakable trend. Foremost among them is the apparent success of Japan and several other East Asian countries at cultivating world-class export-oriented industries behind trade barriers to foreign competition in their home markets. Both politicians and policy-oriented economists have suggested that this record reflects the existence of external economies operating at the industry level and within geographic units such as regions or nations. These gut reactions to real-world observations have been comple-

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mented nicely by advances on a different front—where abstract but well-meaning mathematical economists have been slogging around in the trenches. In their quest for a general theory of growth, they found that they could elegantly close their models with external economies of scale; moreover, they noted at least a superficial consistency of this sort of model with the cross-sectional evidence—high rates of economic growth among nations with high levels of per capita income and very low rates of growth among those with low incomes.

Of course, a major impetus to further study of the subject has also come from the observation that some of today's most dynamic industries in the United States, such as biotechnology and personal computers, are geographically concentrated in a few areas. Since these industries are intensive in human capital instead of a traditional immobile factor like iron ore or warm climate, there has been a tendency to attribute such spatial concentration to the operation of external economies. The magnitude and prevalence of such geographic externalities are not only relevant to issues of regional and national economic development, but also to questions concerning the boundaries, activities, and organizations of firms. If spatial clustering influences the costs of transacting or of coordinating the efforts of different agents or firms, many aspects of the behavior of these firms and agents could be affected, including how they organize their production, their locations, the characteristics of their products, their techniques of production, and the rates at which they invent or innovate.

As scholars have grown increasingly convinced of the significance of external economies operating at the local or regional level, they have had to confront our limited empirical knowledge of the subject. Virtually no systematic investigations have been conducted, so basic questions as to the source or specific content of externalities, the ease with which districts can realize them, their magnitude, the range of industries affected, and their durability over time remain unanswered. For this reason, Michael Enright's work is especially welcome. His paper is but one from a broad project on the localization of industries, and in it he recounts the evolution of the organization of three case industries that have long and fascinating histories of being geographically concentrated. In doing so, Enright discusses the relationships between an industry's degree of geographic clustering and the structure of its firms as well as the coordination mechanisms it employs. Although his treatment is not comprehensive, he also elucidates some of the competitive advantages that firms in certain types of industries enjoy when they are located in close proximity to one another. His principal hypothesis is that geographic proximity enhances the effectiveness of coordinating activities of agents through markets as opposed to relying on hierarchical structures within firms for coordination. Geographic proximity is of course only one of many factors that influence the degree of vertical integration, but Enright suggests that this effect is sufficient to account for a greater diversity in the organization of localized industries than one observes in nonlocalized industries. He notes how geographic clustering is

advantageous for the operation of spot markets which facilitate the bringing together of teams of producers for short-term projects. The clear implication is that industries with short production runs will tend to be more geographically concentrated.

Enright's presentations of three case studies are elegant. But the paper highlights how economists' desire to establish simple lines of causation between geographic concentration and the organizational forms or coordinating mechanisms employed by industries may be frustrated by problems of simultaneity. While geographic localization may encourage more disintegrated industrial structures, part of the empirical association must be due to the tendency for workers in industries whose outputs are best produced (for either technological or demand-based reasons) in small batches or short bursts of time to locate near one another so as to facilitate contracting and fuller employment throughout the year. Similarly, although the extent of geographic concentration and the reliance on short-term coalitions for production will be influenced by the path of technical change, the character of the competition in both the factor and output markets, and government policy, the latter variables will in turn be partially determined in the long run by the historical structure of the industry. The simultaneity problem notwithstanding, Enright's emphasis on the line of causation from geographic concentration to the method of coordination is probably warranted in his examples of filmmaking in Hollywood and wool textiles in Italy—where the organizations of long-localized industries clearly became more disintegrated over time.

There is a powerful logic to Enright's argument. However, the familiar question of sample selection should be considered before drawing general inferences from this study. Although Enright identifies a number of features common to his three cases and outlines an appealing intuitive approach to understanding the linkages between organizational structure and localization, it is not at all clear that the Prato wool textile industry, the Swiss watch industry, and the Hollywood film industry are representative of geographically concentrated industries. Moreover, there is no systematic comparison with a control group of nonlocalized industries. If his goal is only to establish that diversity exists in the organizational structure of localized industries, then the lack of representativeness of his case studies and the lack of a control group do not matter and he succeeds admirably. If, however, he entertains the more ambitious agenda of establishing how firms in localized industries differ systematically from others in their form of organization, or demonstrating that any such difference is quantitatively or qualitatively important, then there may be a problem with his evidence.

For example, all three of his localized industries are characterized over the time period he focuses on by rather small scales and limited runs of production, as well as by labor forces with substantial individual investments in human capital. In such a technological context, one would indeed expect that there

would be frequent expirations of old contracts and entrances into new ones—in order that all parties remain as fully employed as possible. Moreover, it is reasonable that industries in such technological circumstances would tend to be located in geographic clusters so as to reduce the transactions costs involved in recontracting—just as traders in a capital market tend to gather in the same locations to facilitate their trading.

My unease arises from the many cases of localized industries that do not resemble those treated by Enright: Los Angeles and aeronautical engineering for the military; New York and investment houses; Warsaw, Indiana, and artificial limbs and joints; Detroit and automobiles; Pittsburgh and steel; Silicon Valley and computer hardware; Hamamatsu, Japan, and motorcycles; and many other pairs. Admittedly none of these industries is perfectly vertically integrated, but they are nevertheless far from being characterized by fluid firm boundaries, small scale, fragmented production processes, or many of the other features that are associated with Enright's case studies. Instead, they reflect technological contexts other than those considered by Enright that would also serve to encourage the localization of industries. Examples of such other contexts include situations where a locality has a relative abundance of some relatively fixed factor of production for which there is no good substitute, or where technical change is rapid and the firms cluster geographically to keep abreast of the frontiers of knowledge and technology by means of informal channels through which information diffuses spatially.

The existence of nonlocalized industries characterized by extensive subcontracting also presents problems for Enright's analysis. The practice of obtaining parts from remote, independent, and diverse sources to assemble in yet another location is now widespread in many manufacturing industries, and analogous arrangements are also evident in the service sector. The increasing prevalence of this sourcing pattern raises the possibility that immediate geographic proximity may not actually have a large effect on the relative costs of alternative methods of coordinating factors of production. It also reinforces the view that a more systematic empirical investigation is necessary in order to establish Enright's hypothesis about the association between geographic concentration and the organization of the industry.

Concern about problems of sample selection is further heightened by Enright's suggestion that a review of his case studies supports the conclusion that small, disintegrated firms respond more quickly to incremental changes in technology or fashion, while larger, integrated enterprises have the advantage in adapting to revolutionary changes. As one who has been following the fortunes of mammoth firms like General Motors, IBM, and Sears and Roebuck, I find the proposition odd. The case of IBM appears especially telling, because this company appears to have been overwhelmed by the revolutionary changes in the power and design of computers, while the smaller gadflies in the industry thrived and multiplied.

Despite these caveats, I commend Enright for his pioneering efforts to study systematically the phenomenon of localized industries and its association with the ways in which firms are organized and in which technology evolves and is diffused. These are extremely important, if complex, subjects, and his work will advance our understanding of them.