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The Role of Geography in the Information Economy: The Case of Multimedia[1]

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Summary

This article will examine the claims regarding the nature of work in the emerging information society. Particularly, it will be concerned with challenging the "Death of Distance" thesis presented by F. Cairncross (1997), Beck (1998), and others. This view suggests that geography and especially the location of work is increasingly irrelevant to the nature and conditions of labor in the information age. The problem with such an assessment is that it creates the idea that this is the emergent nature of labor for the vast majority of workers. In fact, such employment patterns are not the emerging norm, not even in the high-tech sector itself. This will be exemplified by an analysis of the industrial sector of Multimedia. The article will discuss in detail the spatial distribution of the industry as well as its industrial organization.

1. Introduction

In recent years, the emergence of an information society on a global scale has been heralded as one of the most promising developments for spurring technology, economic growth, job creation, and socio-political change in virtually all advanced industrialized countries (see Castells 1996). Being "wired" is seen as the means to enter the global economy.

Countries, regions, and locales are eager to transform themselves into digital societies.

Many authors have argued that such developments represent a change that will totally transform society, a metamorphosis that will be as great as that which resulted from industrialization. Authors like Negroponte, Toffler and others, argue that the information age will herald in a new epoch in which education, work, social structures, and political institutions will be totally transformed. These changes will result from the nature of the commodity produced in the information age: information. As a commodity, information does not expire with usage and can be transferred to any place on the globe almost instantaneously. Such activity is only limited by the interconnectivity of people around the globe.

The means for this linkage is the Internet. The Internet has two characteristics that give it the potential for creating social change. It has the potential to connect anyone, at any place, to the network. It also integrates software that allows for the display of different types of data and media, such as audio, video, graphics, and text. These properties provide communicative opportunities that never existed before in the history of mankind.

Not surprisingly, advocates of the information society are enthusiastically drawing a picture of a paradisal digital future which for the first time would allow for the disappearance of inequalities, imbalances in social life, and of the unequal access to economic, political and social participation.[2] Literature in this tradition contains an impressive collection of ideas, concepts, dreams, visions, and utopias along with some useful information. In most cases the content of such books, however, consists of questionable forecasts and normative descriptions of how the world would or should look like if the development does in

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[1] The paper draws primarily on the following research: Two surveys done to analyze the situation of multimedia producers in the German state of Baden-Württemberg (Fuchs/Wolf 1998, 1999a), an international comparison of the development of multimedia clusters (Braczyk/Fuchs/Wolf 1999 [eds.]), studies commissioned by the Center of Technology Assessment on employment structures in the multimedia production (Benkert/Michel 1999, Böhm/Volkert 1998) and on the multimedia industry in Saarland, Düsseldorf, München, Friedrichshafen and Ulm. For a summary of this research see Fuchs/Wolf 2000.

[2] A lot of these promises are instrumental for developing policies in Europe and elsewhere and in creating new visions for our future life.

fact take the direction the authors are favoring. As long as the future is presented in the light of what is — or what might someday become — technically possible, however, no adequate representation of events can be expected.

This paper will examine the claims made regarding the nature of work in the emerging information society. Particularly, we will be concerned with challenging the "Death of Distance" thesis presented by F. Cairncross (1997), Beck (1998), and others. This view suggests that geography and especially the location of work is increasingly irrelevant to the nature and conditions of labor in the information age. The reasoning for such a belief is expressed by Martin Carnoy (1998:123), "… [The] new information technologies facilitate the decentralization of work tasks and their coordination in an interactive network or communication in real time, be it between continents or between floors of the same building." Carnoy continues by stating that the decentralization of work tasks provides the possibility for reintegration of the worker into the home and community. Information and Communications Technologies (ITCs) will alter the forces that have shaped the emergence of agglomerated production in the industrial age. The further assumption of this point of view is that this will produce a more even distribution of economic development and overcome the fragmentation created by the industrial age. The problem with such an assessment is that it creates the idea that this is the emergent nature of labor for the vast majority of workers. In fact, such employment patterns are not the emerging norm, not even in the high-tech sector itself.

I will examine the nature of work within the high-tech production sector known as "multimedia". The paper will discuss in detail the spatial distribution of the industry as well as its industrial organization.

Spatial distribution. The locational needs of the industry are thought to be severely altered, since firms will no longer need to concentrate within territorially based clusters. Physical proximity will be replaced by the ability to communicate and transfer products over the 'net'. The 'Death of Distance' (Cairncross 1997) and an increasing irrelevance of geography are widely postulated. It is assumed that globalization based on ICTs as a catalytic element will replace the hitherto driving forces towards industrial agglomerations. If this is true, a more balanced spatial distribution of (in our case) multimedia production structures is to be expected. If, however, a further concentration and cluster formation perhaps even in urban agglomerations can be found, the expectation of a more equal spatial distribution in favor of areas that have until now benefited less from globalization and from the advantages of ICT is obviously misleading.

Industrial organization. A second expectation is related to new forms of industrial organizations which are thought to be characteristic of the information society and for which multimedia is thought to function as a style-setting forerunner. Catchwords for this would be virtual organizations and enterprises, network organizations and so on. There is already an extensive literature often closely connected with multimedia and associated industries which assumes that the actors in this field prefer very flexible, loosely coupled and primarily temporally maintained relations with their contractors, partners, and employees. There is a widespread expectation that companies in the multimedia sector are very virtual, which is again based on the assumption that companies using new ICTs very intensively should also have organizational forms that reflect the heavy use thereof. Is this expectation justified?

After defining multimedia, I will discuss the issue of "where" employment in the multimedia sector is located (spatial aspect) and "how" work is organized in this sector (organizational aspect). Central expectations concerning the changing nature of work in the information society are associated with these two aspects. Before turning to this issue, I will look at the discussion in the social sciences on the importance of regionalization and globalization.

2. Regionalization vs. Globalization

The debate on the future of work in the knowledge economy will be discussed against the background of a scientific as well as policy-oriented discussion on globalization and regionalization in the development of economic regions. Simplifying this discussion, two lines of argumentation can be distinguished, each one identifying a certain type of ties as crucial. The first may be described as the "regionalization thesis". This thesis, which is often used in works on industrial districts, emphasizes the importance of quantity and quality of intraregional networking not least as a means to protect one region against effects of globalization such as the sudden relocation decisions of corporations which are old and well-established in the specific region.

The second line of argumentation, the so-called "globalization thesis", was gaining popularity at the same time as the regionalist argument. According to this thesis, the embeddedness of economic flows in regional networks will decrease in importance and there will be a process of disembedding from regional contexts. According to the globalization argumentation, on the one hand, an environment without any ties will develop as a consequence of globalization. On the other hand and much more relevant in this respect is the argument that certain, i. e. global kinds of ties are crucial within the context of a globalized economy.

The regionalization and the globalization thesis are frequently discussed as being mutually contradictory or as having a paradoxical relationship (see Boekholt/van der

Weele 1998, Huggins 1997). The point of view presented here is different: the medium and long term development of regional economic areas is dependent on a combination of regional and global ties. The combination of both kinds of ties is crucial. Without any doubt, there is a conflict between regional and global ties, but there is no fundamental contradiction.

2.1 Regional ties

Pointing out the importance of the regional context for economic development is nothing new. The basic argument can be traced back to the work of Marshall on industrial districts from the turn of the century. Yet this regional context was given only little attention (see Scott 1995) until about 15 years ago, when the rise of „neo-regionalism" began. The neo-regionalist research perspective consists of various approaches. In the beginning there were studies on *industrial districts* of the so-called „Third Italy" with their distinct pattern of flexible specialization of mainly small companies. Later, regions with similar characteristics were found in other countries, i. e. Baden-Württemberg (see Piore/Sabel 1984, Pyke/Sengenberger (ed.) 1992). At the same time the concept of an „*innovative milieu*" developed (Aydalot/Keeble (eds.) 1988, Camagni (ed.) 1991) describing a complex network of social relations within a limited area promoting the capacity of the respective region to learn and innovate (see Camagni 1991:3). Related arguments for the importance of the regional level in the development of economic systems, especially its capacity to support the generation of innovations, can be found in the literature on innovation systems, particularly in the literature on *regional innovation systems* (see Braczyk/Cooke/Heidenreich (eds.) 1998). Finally, works of Porter (1990), Krugman (1991), Enright (1996) and Fischer (1998) describe the conditions under which spatially concentrated *industrial clusters* with high productivity and competitiveness develop.

These approaches are partly complementary, but they are also to a certain extent contradictory. This cannot be discussed in detail in this context.[3] Nevertheless there are some basic arguments that can be extracted which are useful for our discussion. A testable hypothesis could be the following: if there is a close network of companies and between companies and institutions in a certain region, the competitiveness and economic development of this region will improve. To emphasize the positive effects of networking it can be said — based on the standard literature on this subject — that regional networks

- enable companies to use a common pool of resources (qualified labor, infrastructure, services of supporting institutions etc.),
- help companies to exchange knowledge and to generate innovations; „technology spillovers" among the companies in a region and the possibility to pass on „tacit knowledge" via networks are the most important in this respect (see Bramanti/Maggioni, 1997: 323),
- help them to be in close contact with clients or users and their special requirements,
- facilitate a division of labor so that highly specialized firms can combine and pool competencies.

The neo-regionalist research perspective thus discusses the strengths of regional networks or intraregional ties. There has been much critique of this research work. Some authors found fault with the emphasis on a few exceptionally successful model regions and the neglect of "normal regions" with less favorable conditions. It was also criticized that the regions were frequently described using a neo-regionalist vocabulary without an exact empirical verification whether there were actually important characteristics to be found, such as a structure of predominantly small firms or intensive cooperation among companies (see Krumbein et al. 1994, Markusen 1996, Staber 1996a: 23, Sternberg 1998, Voelzkow 1999). In contrast to the original thesis by Marshall, a lot of the research concentrated exclusively on the issue of networking between companies, with an increasing number of studies questioning the beneficial aspects and even the existence of extensive networking in successful agglomerations.[4]

Without any doubt, this criticism is partly justified and supports the need for a more differentiated treatment of the neo-regionalist arguments. Obviously, the strengths of intraregional networking are only effective under certain regional and sectoral conditions. Regional networking seems to be advantageous

- in sectors with a large number of small and medium-sized companies (SME). Flexible cooperation with other firms may even replace — at least partially — the advantages of organizational size. Larger companies, in contrast, can keep the necessary competencies within their own organization (see Almeida/Kogut 1997);
- in sectors with a high rate of technological change and a high degree of innovations. Works on innovation research prove (see Feldman 1994, Almeida/Kogut 1997, Gehrke/Legler 1998) that especially research- and knowledge-intensive industries show a tendency towards spatial concentration;
- in sectors where predominantly little standardized but customer-specific products are manufactured and

[3] Storper (1997) provides a detailed survey of the competing approaches.

[4] "By selecting samples on the dependent variable (i. e., district success and proximity), investigators have not been able to test the possibility that spatial proximity (1) may be important only under certain conditions, and (2) has variable consequences for firms and networks. Proximity may lead to co-operation or competition, and co-operation among klose-nit firms does not automatically induce innovation." (Staber 1999:1).

where the close contact between manufacturer and customer is particularly important (see Scott 1988);

- in cases where a sectoral mix can be found, which makes it easier for innovative ideas to float more easily. The ecological argument of cross-industry and resource spillovers leads to the prediction that firms are more likely to survive when located in areas where firms are operating in a variety of related industries (Staber 1999:8).

As will be shown below, these conditions can be found to a very high degree in the multimedia industry. Thus, the neo-regionalist approach may, in principle, be applied to this industry. In addition, it may even be said that the strengths of regional ties are characteristic of this industry.

Considering both the fact that innovation is becoming increasingly important for the success of regions and the assumption that innovation is highly dependent on information and knowledge, it would seem that innovativeness implies the ability to access such highly intangible assets by way of networking. Admittedly, a definition for networks or networking is hard to come by in the literature. The appeal of the concept seems to stem from the fact that it encompasses important relationships which are difficult to summarize in a clear definition. Networking capacity at a very basic level can be seen as the disposition of actors to collaborate and communicate to achieve mutually beneficial ends. Actors can be employees as well as employers, companies, associations, public funding agencies, research institutes and so on.

Yet to what extent does the globalization argument contradict these assumptions?

1.1 Global ties

Globalization is the outcome of three main processes which are release firms from the constraints of physical distance and from national regulatory frameworks: (i) the substantial decline in transport costs; (ii) the rapid development of telematics, which is the combination and joint development of telecommunication and information technologies; (iii) the gradual removal of barriers to trade and to the circulation of capital. As a consequence, it is often argued that globalization is weakening nation-states and eliminating the importance of space and territory as relevant dimensions of economic activity. Transnational firms can spread their activities around the world, creating subsidiaries and branch plants in many places, while small and medium-sized enterprises (SMEs) also have more opportunities for globalization. One of the most appealing images is that of virtual firms navigating in cyberspace, where the best suppliers and customers can be found and all types of business contracts can be made, no matter how large their partners or where they are located. According to this view, a globalised world is a very favorable environment for footloose organizational forms with atomistic behavior, guided only by self-interest and the invisible hand of the market.

The purest expression of such ideas can be found in various popular publications (see Martin/Schumann 1996, Forrester 1997). In a more moderate form, this thesis is also mentioned in numerous publications from social scientists and economists (see Thurow 1996, Altvater / Mahnkopf 1996, Castells 1996). Briefly summarized, the globalization thesis argues that because of rapidly advancing globalization, economic structures and flows are increasingly disembedded from regional contexts and regional embeddedness is losing importance. According to the globalization thesis, companies act on a global level and most globalized companies become key actors whose strategies will increasingly determine the possibilities for the development of certain regions. “Regions become the object of companies in the process of international restructuring” (see Iwer/Rehberg 1999). And for Ash Amin (1993: 288) the consequence is: “The meaning of place is becoming defined within the hyperspace of global corporate activity.”

This perspective emphasizes the importance of global ties. No longer is the quantity or quality of intraregional networking crucial, but rather the integration of economic regions in worldwide networks. The position of regions in the organizational structures and networks of “global players” determines their possibilities for economic development. Even the “model regions” which are often analyzed in industrial district research come under pressure due to globalization (see Voelzkow 1999).

The possible strength of global ties may be to counterbalance the lack of flexiblity in regional structures. As a matter of fact, the strengths of a distinct regional network may change into weaknesses if they hinder the adjustment of regional economies to modified technological and economic conditions. This is also acknowledged by the neo-regionalist research perspective (see Grabher 1993 on the Ruhr region, Heidenreich/Krauss 1996 on Baden-Wuerttemberg). Regional economies frequently develop along stable trajectories. To leave these trajectories, impulses from outside are necessary. In this context, Camagni (1991:3ff) sees the special function of innovation networks in offering the chance for one innovative milieu to come into contact with others and to use these contacts to import new technological possibilities, organizational models and commercial ideas into the system as well as to protect itself from “death by entropy”.

For multimedia and other young growth industries in particular, this correlation is most significant. If one compares specific regions (see Braczyk/Fuchs/Wolf (eds) 1999), it can be demonstrated that regions having developed exemplary strengths in mature industries do not

necessarily have advantages in multimedia production structures. Existent and working networks in established industries do not guarantee rapid growth in innovative future industries. Exogenous regional strategies are relevant when aiming at establishing competence in new sectors by attracting highly competent actors outside of a certain region. In other words: global ties have special strengths when regions want to tread new paths for which the previous economic and structural development did not offer favorable starting conditions. Global networking provides contacts for regions to sectoral "centers of excellence" in research and development and connections to extraregional markets.

In a large part of the above-mentioned literature on the globalization thesis, the strengths of global ties are emphasized less than the problems and risks from the viewpoint of economic regions, in particular the restrictions of the regional ability to act proactively and the fragility of global ties. Regional policies are forced to provide attractive conditions for global players probably leading to a process of competitive dumping among the regions (Iwer/ Rehberg 1999). Moreover, globalized companies with weak ties to a specific location will probably remove business units from a region at short notice. The more important these business units are for the economic performance and employment of a regional economy, the more problems arise due to decisions to remove operations from a region.

The issues of the importance of place in economic organization is a very complex one. Our research shows that "place" does still play a significant role, but that this role has changed. While it is worthwhile to look at old theories on agglomeration dynamics, it is equally important to take account of changes; for example, the undoubtedly significant changes in the way corporations decide on the location of their research and production units (cp. Jürgens 1999, Reger 1999). At the same time, the particular characteristics of place have become more important and corporate strategies have become more flexible.

3. The Multimedia Sector

I will now try to test such assumptions by looking at the multimedia sector. At the moment, multimedia is a widely used catchword. It is difficult to find a precise definition or a concept on which there is agreement across disciplinary boundaries. The technical artifact "multimedia" is usually described as a combination of several digital media, which are partly time-sensitive (e. g. sound or moving pictures) and partly time-insensitive (e. g. graphics or text) and which can be used interactively and in an integrative manner. Multimedia products can be used locally (off-line, e. g. CD-ROM) or by using telecommunications networks (on-line). In the latter case, they build upon an existing or a developing telecommunications infrastructure.

In more general terms, multimedia is used to describe the present state in the development of ICTs. Important actors in this field are content developers, program and service providers, network operators and new suppliers of network transmission capacities, software producers, hardware producers from the areas of the computer industry, the telecommunications industry, and the consumer electronics industry. This broad characterization is useful in order to identify the actors that are possibly participating in the "multimedia" value chain. There will be few exclusive multimedia actors or multimedia corporations, although many corporate actors are in a position to contribute something to multimedia development. In the foreground of multimedia, however, is "content". The growing importance of the creation, manipulation and packaging of digital content has been stressed in a variety of studies on multimedia (cp. Scott 1998).

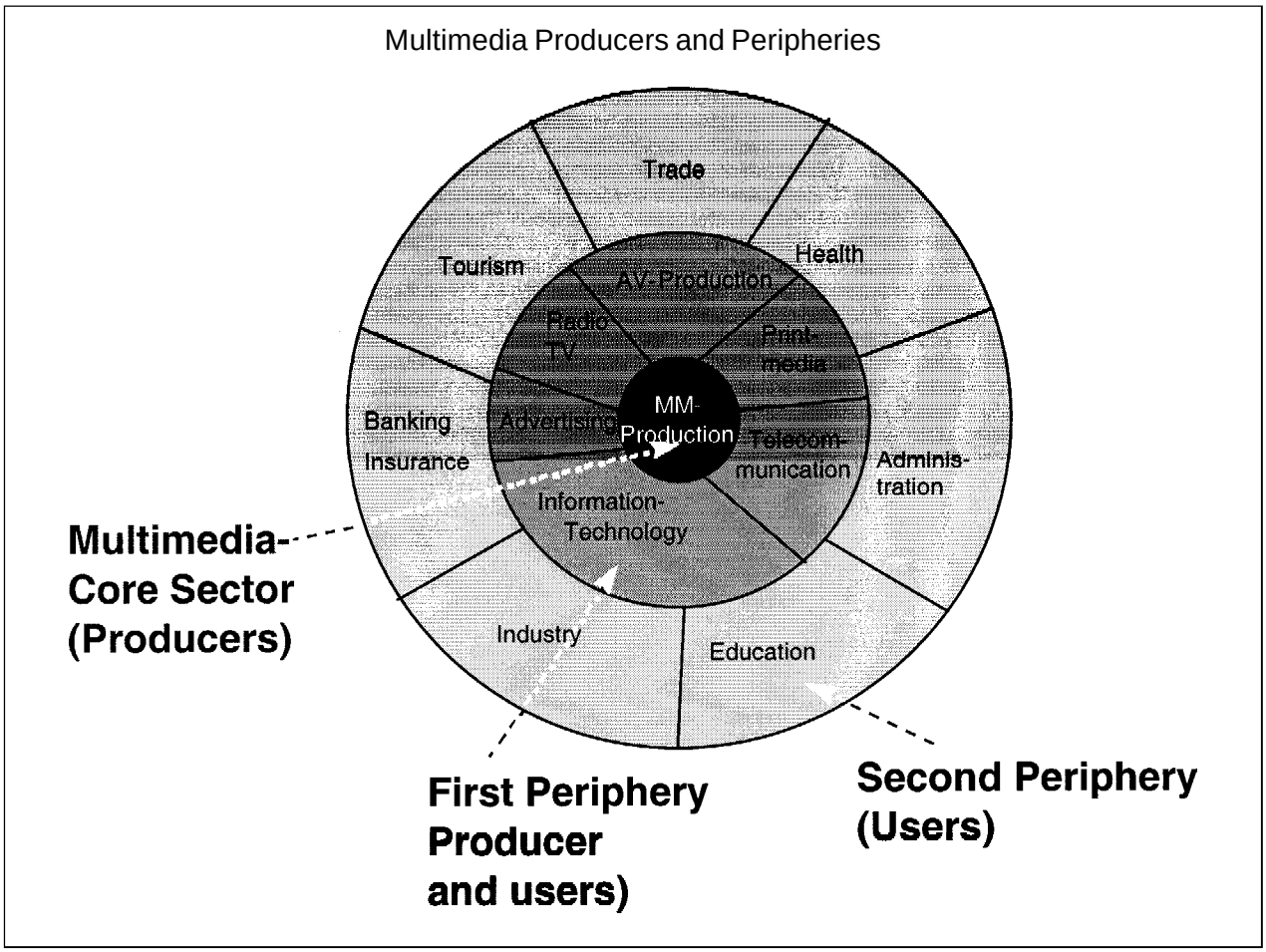
The focus of the research presented here is on one group of participants in the multimedia value chain: the producers of multimedia content. It has to be stressed that while only a very small number of companies concentrate exclusively on multimedia activities, a larger number of firms develop a part of their business in this direction. These firms belong to sectors with a close affinity to multimedia, such as publishing, broadcasting and advertising (see figure 1). Multimedia as such may not represent a sector in its own right. For the sake of brevity, I will leave this discussion aside and talk about a multimedia sector nevertheless — well knowing that for some, multimedia represents above all a cross-sectoral productive and service activity.

The lack of clear-cut sectoral boundaries renders the analysis of the emerging multimedia industry difficult. Adding to this, the newness and rapid development of multimedia implies that multimedia production is very inadequately registered in most official statistics. Thus, much of what is presented here draws on exploratory work, case studies and qualitative interviews. Inevitably, therefore, the inter-regional comparison that is being done in this paper has to be looked upon with some caution.

4. The Spatial Logic of Multimedia Production

Contrary to many expectations, all available research shows that multimedia producers are concentrated in only a few locations. Multimedia production clusters do exist: a concentration of production in certain regions is manifest (see Braczyk/Fuchs/Wolf [eds] 1999). While the power of this technology opens up new possibilities for long-range collaboration, it does not, as some suggest, end the importance of place in economic organization. The emerging business of multimedia content creation, which is best

Figure 1



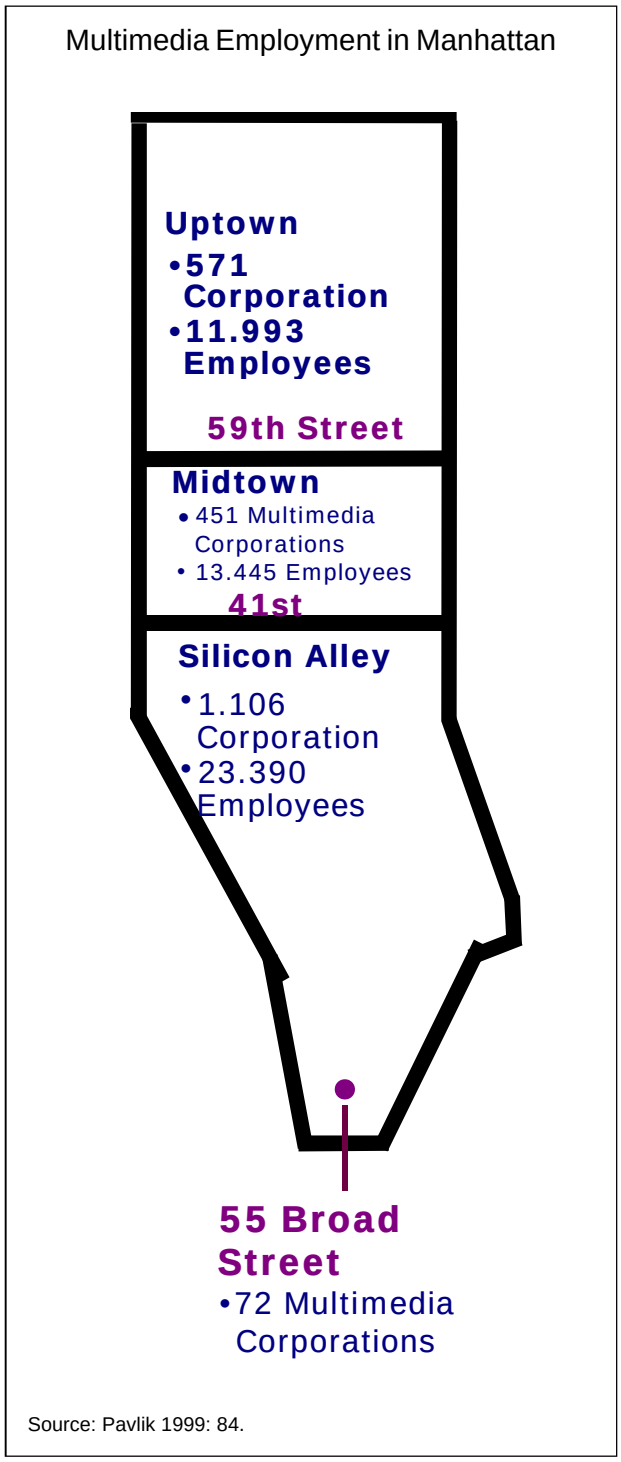
prepared to take advantage of the space-transcending ability of the Internet, exhibits much of the traditional unevenness that has characterized urban and economic development in the past. The fact that information and content can be easily and widely distributed is often mistaken for an indication that the organization of this business is also necessarily diffused. In fact, there is a much more complicated dynamic involving the connection of specific places to global networks resulting in a system of production that is both place-rooted and networked at the same time.

Available research on the multimedia industry shows that multimedia clusters typically develop in metropolitan regions with service-oriented economies.[5] For example, the majority of Canadian multimedia corporations are to be found in Toronto, and 47 percent of all Swedish firms are concentrated in Stockholm. In peripheral and/or less favored regions there is usually only a low density of multimedia production. The typical locational pattern within regions can be characterized as a concentration within urban centers or even specific streets, building complexes or buildings (facilitated by a low need for office space and the locational preferences of the creative key personnel). A good example of this phenomenon is the concentration of New York firms: 1,106 out of 4,881 firms are concentrated in one small area of Manhattan ('Silicon Alley') (see figure 2). This bespeaks the persistence of agglomeration effects (the concentration of multimedia production attracts even more firms and staff). It seems very likely, then, for regional disparities to persist or even to increase in importance.

The industry in general — regardless of remarkable regional differences in maturity — is still in its pre-mature phase. The actors involved may experiment with different forms of organization, including electronic tele-cooperation, but up to now they apparently prefer face-to-face

[5] Various research has shown that, due to knowledge spillovers, agglomerated regions in highly developed countries are better 'breeding places' for innovation than rural areas (see e. g. Feldman 1994). Considering the locational bias of multimedia production towards urban places, it becomes apparent that the popular metaphor of the 'global village' (MacLuhan/Powers 1989) is misleading with respect to this aspect of the emerging information society.

Figure 2



Source: Pavlik 1999: 84.

communication for core production. Within the framework of conventional but very flexible in-house organization, the firms practice cross-organizational collaboration with changing partners who, again, prefer to maintain and to rely heavily on direct communication. There is some evidence that multimedia core production depends on deep discussions among those people who participate in developing and producing multimedia products. The necessity for close discursive relations with customers from the beginning of a project until the product has been implemented in the environment of the customer explains this preference. The local or regional character of multimedia production is confirmed by a variety of survey data as well. Most companies heavily stress that they have strong ties to their specific location. Most of their customers and usually their co-operation partners as well are there (see Fuchs/Wolf 1999a). This even holds true for most of the free-lance work: even if it takes place at the home of the employee, this home is usually in the same area as the office of the employer (cp. Böhm/Volkert 1998).[6]

As one can see from the available research, multimedia producers are exposed to a tight labor market. The supply of personnel is generally considered to be a very crucial variable. The lack of personnel across the different regions analyzed has been identified as an important obstacle to potential future growth. In virtually all regions, a mismatch between the skills available on the labor market and the skills needed most urgently by the multimedia producers is a potential — if not already acute — problem.

Given this situation, it is all the more important to be able to lure people to the important multimedia locations. This is a crucial factor even for thriving regions like California (which attracts significant numbers of out-of-state workers), Toronto, New York, Stockholm and Munich. The experts and specialists needed prefer to stay and work in the centers of metropolitan cities. Thus, to a certain extent, the present shape of the multimedia labor market serves as a force which attracts firms and new entrepreneurs to such locations. Concerning the present tightness of the multimedia labor market, one should take into consideration that even the most attractive places to live and to work will, as it were, compete with one another for the best-qualified and most highly-skilled labor. In that respect, the distinct local profile of a place will be among the top factors determining the further development of regional multimedia clusters.

Eventually, core multimedia production aims not only at tailoring products to individual customers' needs but also processes content which is predominantly culturally specific. Thus, production is embedded in and part of a given local understanding, signification and interpretation of "the world" which obviously favors face-to-face communication. One can say that parts of multimedia core production depend on economically valuing and exploiting regionally bound cultural assets.

It is no wonder, therefore, that we also see a strong case for path dependency in the multimedia sector. Multimedia in the different locations researched draws on the advantages and disadvantages created by the pre-existing economic base. Multimedia firms are not linked to one other, but to their customers. Who their customers are

makes a difference in the organization of production, the workforce skills, and product-specific expertise. Again we see that the industry is not as footloose as is often expected. Prime customers for the multimedia industry are traditional media corporations. Therefore, most multimedia agglomerations are to be found in the traditional centers of the media industry, such as New York (publishing), Hollywood (film), Munich (film and public radio and television) and so on. Even in the US, data show a clear specialization of multimedia clusters that can be attributed to the specific history and market conditions in the specific locations (Egan/Saxeninan 1999).

In a recent study, Zook (1999, 2000) further confirmed this view for the US by using a methodologically innovative approach to study the Internet content industry. In particular, three regions — San Francisco, New York and Los Angeles — appear as leading centers for Internet content in the United States both in terms of absolute size and degree of specialization.[7] Moreover, it appears that there is a stronger connection between Internet content and information-intensive industries than between Internet content and the industries providing the computer and telecommunications technology necessary for the Internet to operate. However, one of the most interesting aspects about the three leading regions is that although they all have a significant Internet presence, they are very dissimilar to one another in basic industrial makeup. This suggests that there are multiple pathways towards the development of an Internet contents specialization. Industry analysts often point to the existing high technology industries of Silicon Valley, the financial and publishing industries of New York, and the entertainment industry of Southern California to explain their high concentrations of Internet-related activity. Zook distinguishes between two hypotheses:

1. The growth of the commercial Internet is largely based on the technological abilities contained within a region. Therefore regions which have strong high-tech industries have an advantage in developing firms producing Internet content.
2. The real competitive advantage in the Internet content business lies in a region's ability to produce information to be distributed via the Internet. Therefore regions with large media or entertainment sectors such as New York and Los Angeles would be at an advantage.

This first industrial cluster — Internet technology — is defined as including computer manufacturers, telecommunications, and software. The second — the informational industrial cluster — is made up of media and publishing, entertainment, advertising and public relations and advanced users. The question is, in other words, whether the growth of Internet content production is more closely tied to the technological capacity generated by specialization in technology or to the supply of informational products from a specialization in informational industries. Zook's analysis provided impressive support for the second hypotheses. Industrial strength in traditional ICT-industries does not seem to be a strong indicator for future strength in the Internet industry. The informational cluster, however, does work as a powerful indicator.[8]

Although the Internet's dispersal allows for greater accessibility to the content put forth by anyone, recent re-

[6] The Electronic Commerce Enquete II asked questions about the cooperative behavior of firms in general. 49% of the companies surveyed said they would not cooperate via the Internet with unknown partners. Only 4% of the companies voiced a strong support for this practice (Computer Zeitung 1999).

[7] The top five metropolitan concentrations of domain names New York, Los Angeles, San Francisco, London and Washington, DC contain 17.5% of all domain names. US Regions with the most domain names per 1000 firms are: San Francisco 1,719, Provo, UT 1,648, Los Angeles, 1,246, San Diego 1,226, Las Vegas 1,195 (Zook 1999).

[8] For the case of Germany, cp. Eckert/Egeln 1997.

Table 1

Percentage of US Multimedia Firms in Five Metropolitan Regions By Stage in the Value Chain, 1997

	San Francisco Region	Los Angeles Region	New York Region	Boston Region	Seattle Region	Other US Regions
Digital Input Devices	11.4%	11.0%	9.9%	8.8%	2.1%	56.8%
Multimedia Hardware	20.4%	10.5%	7.7%	8.1%	1.5%	51.8%
Development Software	13.1%	6.4%	7.4%	10.9%	3.0%	59.2%
Multimedia Products (CD-ROMs)	13.0%	6.1%	7.9%	9.0%	3.7%	60.3%
Telecom. Hard & Software	15.6%	7.4%	10.4%	10.0%	1.6%	55.0%
Digital Output Devices	9.2%	12.1%	12.1%	10.5%	2.5%	53.6%
TOTAL	100%	100%	100%	100%	100%	100%

Source: Corporate Technology Information Services; Egan/Saxenian 1999, 21.

search by Adamic and Huberman (1999) suggests that rather than leveling the playing field for many content sites, the Internet tends to reinforce and increase the gains of leading information creators and providers. (Zook 2000: 19)

These arguments confirm a more general idea from innovation research which suggests that knowledge-intensive businesses are not as footloose as is often expected. An important argument relates to so-called 'tacit' knowledge. It has been suggested that in addition to formalized, well-documented and tradable knowledge, 'tacit' knowledge plays an important role in innovative activities. Tacit knowledge is based on practical experience with certain technologies. It has also been characterized as 'implicit', 'idiosyncratic' or 'uncodified' knowledge. It is not available in textbooks or training courses, but it may be transferred from person to person (see Polanyi 1962, Dosi 1988, Storper 1996). These properties of 'tacitness' have a number of implications for firm behavior: most importantly, the dependency of firms' operation on tacit knowledge requires personal contact and physical proximity.

5. The Organizational Logic of Multimedia Production

There are marked differences among regions in industrialized countries around the world in terms of the maturity, competitiveness, density and specialization of their multimedia production sectors. Therefore, it is clear that geography still makes a difference. This, however, is only half of the picture. The other half is a remarkable amount of similarities in the development of multimedia production all over the globe. In many respects, multimedia production seems to be organized quite similarly in American, European and Asian regions. So while we find diversity on the one hand, we find uniformity and isomorphism on the other. What factors are supporting trends towards universal structures in multimedia production and what are these universal structures?

The broad availability of standardized software tools for multimedia production, driven by the market expansion strategies of some multinational key players (see above), is the first important factor. As a consequence, there is comparatively little variance in the technological base and in the production processes used by multimedia producers in different regions. In general, the capital requirements for launching an enterprise and running multimedia production are comparatively low (at least when compared with other high-tech sectors such as biotechnology). This allows for low barriers to market entry and a high number of newly established firms. Of course, low entry barriers do not guarantee for good survival prospects. In fact, a comparatively high rate of firm mortality is also typical of the multimedia industry in many regions. The average size of multimedia firms is small (see table 2), their average age is young (see table 3), and in both respects there are only minor inter-regional differences.

Given the small average size of the companies in the core sector of multimedia production, the extent of job creation in this core sector is comparatively small and not sufficient to solve the labor market problems which are due to a general process of economic restructuring and the loss of jobs in manufacturing. This even holds true for the most advanced multimedia clusters.

Also in virtually all regions, not only the companies but also the founders of the firms themselves and their employees are very young.[9] This seems to be related to the specific image of multimedia (a technology most popular among the young) but also to the specific qualification requirements. Multimedia entrepreneurs and their employees all over the world are highly qualified and skilled. Many firm founders start their businesses immediately after graduation from a university and the percentage of academically trained personnel is remarkably high. As multimedia is a very fast-changing technology, the employees must be willing and able to constantly adapt and learn. On average, these employees are highly motivated, willing to work many hours a week and at 'unusual' times of day and night, and to accept flexible forms of work organization as well as occupational patterns.[10] They expect, among other things, a vivid and varied cultural scene

[9] Cornford (1997: 9) cites the example of a company in North East England: 'The firm has 14 full time employees (two have just been taken on); (…) the oldest employee is 45, the next oldest is 35 and almost all others are in their 20s'. In a sample of multimedia firms in Silicon Alley analyzed by Heydebrand (1999a), the average age of the CEO is 32. According to the Coopers and Lybrand study on New York, the average Multimedia executive was 42, 36% of the workforce was under 30 years.

[10] The New York survey done by Christopherson (1999) found an average work week of 52.5 hours.

Table 2

Staff Size of Multimedia-producing Companies

Region	Average number of employees
Scotland	9.4
North-east England	10
Stockholm	10[a)]
Stuttgart	10.5
Dusseldorf	12
Toronto	13[b)]
Tampere	14.7
New York	21.6[c)]
San Francisco	44% have less than 10 employees

[a)] median; [b)] excluding one very large firm in the sample; [c)] including freelancers

Source: Braczyk/Fuchs/Wolf 1999, 405.

Table 3

Age of Multimedia-producing Companies

Region	Year of Foundation
Toronto	40% founded after 1993
Stuttgart	61% founded after 1993
San Francisco	64% founded after 1993
Saarland [a)]	most companies founded after 1995
Stockholm	50% founded after 1996

[a)] See Matthäi/Schmidt (1998, 16)

Source: Braczyk/Fuchs/Wolf 1999, 406.

in the area where they work and live. This is part of the explanation for the locational preferences of multimedia firms we described above. Moreover, the rapidly changing qualification requirements make it difficult for the education and training institutions to keep pace, and stable training schemes are hard to establish in multimedia production.

An important attribute of the multimedia workforce is therefore its flexibility. This can be demonstrated by the high degree of irregular or contingent employment. Baden-Württemberg companies have on average a 2:1 ratio between regular employed staff and free-lancers. In New York almost half are part-time, independent workers or independent contractors. The average length of employment for a multimedia worker in New York is six months.

The literature on project-based work and its implications for the workforce has focussed on how individuals build a career by acquiring new skills and exploiting social networks. It suggests that people engaged in project-based work not only need to work differently than those who are employed in traditional firms but also that they need to see their career progression in very different terms. The skills that are necessary are usually acquired by self-instruction. This is shown, for example, by a survey of the multimedia workforce in New York: 90% of the respondents called it the most important source of skill training, followed by on-the-job training (70%) and friends, peers and colleagues (50%).

Multimedia workers cope with the insecurities of their profession in a variety of ways. Interestingly the most advanced forms of self-organization can be found in the US: in New York and California. In these cases, workers are organizing formal and informal networks to share information about market developments and jobs, to negotiate for group health insurance, and to lobby on their behalf (cp. Christopherson 1999).

Another feature of the industrial organization of the multimedia sectors is the variety of special types of co-operation that have developed there. Multimedia products (CD-ROMs or World Wide Web presentations) are complex, integrating different media and combining programming know-how with artistic, didactic and design skills. Few multimedia firms, especially given their small average size, can afford to have all these necessary skills in-house. As a consequence, as mentioned above, a comparatively high level of inter-firm co-operation[11] and free-lance employment can be found in the multimedia industry.

This can even be shown for a multimedia latecomer like Baden-Württemberg and its climate, which is not very conducive to inter-firm co-operation. In a survey by Fuchs/Wolf (1999a), only 12% of the companies there said that they do not routinely co-operate with others in conducting projects.

Another factor which places limitations on diversity is the dominance of the English language in the world of Internet and multimedia. This is not to say that non-English languages have been unimportant in the development of regional multimedia clusters. The examples of Wales (Cooke/Hughes 1999) and Finland (Schienstock/Räsänen/Kaukonen 1999) demonstrate that regional multimedia producers may occupy a niche for products in the respective language and adapted to the respective cultural environment. Within these niches, the multimedia companies may develop and grow. However, the size of their markets will remain limited unless they are able to produce in English, as well. English language skills thus are of paramount importance for the long-term development perspectives of regional multimedia industries. In fact, the examples of Ireland (Fuchs/Wolf 1999b), the Netherlands (Naylor 1999) and the Scandinavian countries (Sandberg 1999) show how a high level of English skills favors the development of multimedia production.

It seems very likely that the tendencies towards uniformity will be amplified by the spread of IT-applications in electronic commerce and related fields. Electronic commerce is commonly expected to grow very rapidly in the short and medium term. In fact, 'e-commerce' has become the new buzzword, even outshining 'multimedia' (although the subject matter denoted by both words overlaps to a certain extent). Most observers agree that a set of norms, standards and mass products (for example, standardized software for encryption and electronic payment) are necessary prerequisites of complete electronically-based economic transactions. If this expectation is justified, then the growth of electronic commerce will be accompanied by a trend towards more uniformity. This, in turn, may further restrict the scope — and the market — for the individual multimedia solutions most of the specialized multimedia companies focus on today. Increasingly, these com-

[11] For instance, in the case of Stockholm, 'three quarters of the companies say that they co-operate with other new media companies working on new productions' (Sandberg 1999).

panies may have to specialize in add-ons to the standardized products offered by some key producers.

Thus, to sum up the argument of this section, more than differences between nations or regions, sectoral properties that are not space-bound seem to shape many important aspects and development prospects of industrial organization in multimedia production. From the perspective of theories of industrial governance, this is a very interesting result. There has been a long-standing debate (see, for example, Hollingsworth/Streeck 1994) about whether the organization of an industry depends more on the national economic and institutional framework (and therefore varies between different countries and regions) or on properties of the respective sector (and therefore is rather similar irrespective of the country or region). Our analysis gives some support for the latter hypothesis and can thus be seen as confirming the theoretical position (which perhaps is best elaborated in Kitschelt 1991) that sectoral, basically technological, properties are crucial factors in explaining sector organization. This holds true at least if we focus our attention on two dimensions of sector organization, namely division of labor and intra-sectoral cooperation. Whether or not it is also true for other dimensions, such as the organized representation of sectoral interests or the linkages between the political system and the industry, cannot be elaborated here but would be a worthwhile subject of further research.

6. Summary

Considering the data and interpretations presented here, many of the standard expectations of why many firms in one industry would locate in the same region still seem valid. The information society and multimedia do not bring about radical changes in this respect. It is relevant here to recall the research following in the tradition of Marshall (see Krugman 1991), which claims that industry concentrates

- because concentration in the same region provides a pooled market for workers with specialized skills;
- because an industrial district allows for the provision of a greater variety of inputs by specialized suppliers;
- inter-firm information flows are enhanced by physical proximity. By concentrating within an industrial district, firms can more easily take advantage of technological spillovers.

All these characteristics are elements that play an important part in the description of the locational logic of the multimedia industry.[12]

The multimedia industry has many characteristics which are typical of a specific type of service industry. According to Strambach (1993), such industries are characterized by an intensive process of co-operative interaction and exchange of information between service provider and client which derives from the client's need for explanation, clarification, interpretation and detailed instructions for applications (Heydebrand 1999b). This accentuates the importance of locational proximity. Thus, the expectation that distance no longer matters cannot be validated.

An often-cited example is the geographical concentration of the financial services industry, for example in the city of London. Foreign banks opening offices in London often cite the availability of a skilled labor pool as a decisive factor in their choice of location, and employees see the advantage in the choice among hundreds of potential employers. The complementary businesses are there, from telecommunications companies and information providers such as Reuters to the huge range of elegant wine bars and restaurants. Even a more product-oriented industry like biotechnology concentrates in a limited number of locations for similar reasons. It is important to note, however, that these economic sectors do not all concentrate in the same region, and that the attracting factors may be different for each sector in question. Banks may be able to concentrate all their trading in one place to exploit the undoubted economies of scale — the pool of skilled staff — because it costs almost nothing to ship the finished 'product' — the electronically registered financial transaction — to the right computer in the right place.

If this is indeed a determining factor for the financial services industry, it is not an important consideration for multimedia producers or even biotech companies — to name another sector that is characterized by a high concentration of companies. In these sectors, it also becomes clear that electronic communication is not so much a substitute for, as it is a complement to, face-to-face contacts.

In almost all economic branches, jobs involving far-reaching decision-making authority and requiring a high level of education as well as frequent face-to-face contacts with other highly qualified specialists show a strong tendency toward spatial concentration in a few centers. Routine activities in production and administration not requiring high educational levels, however, show a trend towards decentralization (Date/Schmid 2000). The higher the educational level of the employees, the higher the spatial concentration of their jobs.

The question of which parts of an organization and which services and professions are bound to higher-ranking central locations and the question of which economic

[12] Although all three of Marshall's forces are clearly operating in the real world. The new geography models have generally downplayed the first two, essentially because they remain hard to model in any explicit way.

activities or parts of an organization can be moved to smaller cities or peripheral regions without a loss (or even with a gain) in efficiency and competitiveness depend increasingly on the importance of face-to-face contacts. Many studies have shown that the higher a person's professional status in an organization, the larger the number of his or her external face-to-face contacts to decision-makers of other organizations and especially of contacts involving planning and orientation, and the smaller the number of routine and indirect contacts.

Uncertainty generally increases the need for and the frequency of face-to-face contacts with important decision-makers from other political, economic and cultural organizations. Functions and subsystems in the middle levels of the hierarchy have a more limited number of choices of appropriate locations. The requirement for face-to-face contacts of the upper management levels of a large organization can be met only in a few major cities.

Only in major agglomerations is the indispensable environment available that enables fast and spontaneous face-to-face contacts among decision-makers in government, large industrial corporations, research, finance and insurance, international news agencies and so on. Proximity to these institutions provides top management with sources of crucial information, thus facilitating their adaptation to new situations and developments. Early information is especially important in areas that have to deal with a high degree of uncertainty, where economic success often depends on fast, risky decisions. The most important protection against the uncertainties of business life is prompt knowledge of innovations, economic developments and political changes.

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Zusammenfassung

Die Rolle des Raums in der Informationsökonomie: Das Beispiel Multimedia.

In der Diskussion um die Zukunft der Arbeit in der Informationsgesellschaft findet sich sehr häufig die Ansicht vertreten, dass durch die rapide fortschreitende Globalisierung wirtschaftliche Strukturen und Abläufe zunehmend enträumlicht werden und ihre regionale Einbettung immer mehr an Bedeutung verliert. Der Beitrag versucht diese Behauptung zu relativieren. Er tut dies beispielhaft mittels einer Analyse der Multimedia-Industrie. Untersucht wird die räumliche Verteilung der Multimedia-Produzenten sowie die Unternehmens- und Beschäftigungsstrukturen.