

Multimedia Industry Networks and Regional Economic Development Policies: The case of the Netherlands

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Summary

The emerging information economy is accompanied by processes which also fundamentally affect the information and communication industry. One of these processes — convergence — produces the multimedia industry as the dynamic core of this information and communication industry. The organisation of multimedia production is an exemplary illustration of the organisational configuration which is associated with the new information economy, that is, the network organisation. Although information and communication technologies are believed to make the location of business activities less important if not irrelevant, multimedia firms are usually regionally concentrated and, in fact, many regional authorities attempt to make the multimedia industry the driving force of their region's economic development. This paradox will be discussed theoretically and empirically in this article.

1. Introduction

The media, or more broadly, the information and communication industry, is going through a transformation which is part of the rise of a new technical-economic paradigm that is characteristic of the information economy as a whole. Ongoing processes of technological innovation, interacting with economic and political processes (globalisation, privatisation, deregulation) are changing the information and communication industry in many ways. One such change is indicated by the term 'convergence': fading distinctions between sectors which traditionally were divided along media lines — publishing and printing for folio products, broadcasting for audio-visual media — resulting in an integrated information and communication industry. Another change is the rise of network organisation, meaning a form of organisation which is internally characterised by a structure consisting of small, multidisciplinary teams with a large degree of autonomy, and externally supported by a network of organisations with which relations of co-operation or outsourcing are maintained. The multimedia industry, which is emerging as the dynamic core of this information and communication industry, is an interesting case to study because its features show how the potential of information technology interacts with other factors to create regionally concentrated networks of multimedia producers. This article will discuss this outcome which may seem paradoxical, since with information and communication technologies (ICT),

physical proximity is no longer a requirement for successful collaboration between people in general.

This contribution begins with an analysis of the process of convergence, of which the growing multimedia industry is a result. Subsequently, alternative configurations of ICT-enabled networking will be explored, as well as several factors which, in the case of multimedia production, might theoretically be assumed to promote one type or another. Then some relevant empirical data concerning multimedia firms in the Netherlands will be presented, one feature of which appears to be their collaboration in predominantly regional networks. This characteristic will be discussed both with a perspective on the theoretical framework, and with a perspective on regional economic development policies.

2. Convergence

Convergence in the information and communication industry is often equated with the rise of the multimedia industry. Over the past twenty years, there has indeed been a growing number of conglomerates, active in several media sectors. The largest European media firm,

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Bertelsmann, is a case in point, with interests in daily and weekly newspapers, books, television, radio, music and online services. A Dutch example is Wegener Arcade. Ten years ago, Wegener had about 2000 employees and activities were limited to regional dailies and weeklies. Now they employ over 5000 people in the fields of dailies, weeklies, exploitation of financial databanks, music, television, radio, cable TV information services, and direct marketing. Wegener Arcade like to present themselves as a multimedia firm, no doubt because the buzzword multimedia is associated with innovation and dynamics. It is true for most media enterprises, however, that they are engaged in separate media activities. Multimedia in the wide sense, then, means little more than different kinds of media or mixed media (De Boer 1997).

There are, however, companies which specifically produce multimedia or new media. Both terms are used to refer to media which integrate text, graphics, moving pictures, sound and data, and enable interactive use. Multimedia are usually classified into applications on off-line multimedia such as CD-ROM and Digital Versatile Disc (DVD), which operate on stand-alone platforms (multimedia computer, DVD-player), and on-line multimedia such as websites which can be approached through telecommunication networks. There are numerous examples of current multimedia applications, such as educational applications, games and product presentations, and electronic commerce. Multimedia products and services are produced by firms which, depending on their original competence in the media industry, have built up alliances with other firms that have their core competence in other aspects of multimedia production, or have employed such specialists themselves. This is where the profile of a multimedia company in the narrow sense emerges, where multimedia stands for the integration of formerly distinct disciplines, products and services.

At the level of the industry, there is an ongoing development towards integration or convergence of sectors in the information and communication industry, including not only traditional media such as publishing and broadcasting, but also providers of software and telecommunications services (Baldwin, Mc Voy, Steinfield 1996; Dialogic 2000). This convergence is made possible by developments in ICT, especially by digitalisation. By means of digitalisation, all kinds of information, whether in the form of data, text, images, or sound, can be manipulated and integrated on the basis of their common information structure. Due to developments in telecommunications technology, moreover, ever-larger quantities of information can be transported per second. The convergence of information and communication technologies has given rise to the term 'network society'. Authors like Castells (1996) and Van Dijk (1994) employ this term to indicate that the integration of technologies is simultaneous with the integration of economic activities. For the media in-

dustry, this does not mean the disappearance of media companies that go on deploying their activities in the field of traditional media, as they have always done. But in all sectors of traditional media, one can find examples of activities originally extraneous to the sector. Instances can be found in pre-press companies which have survived restructuring as a result of Desk Top Publishing, thanks to innovation and diversification, and which now offer services in the areas of graphic design, digital photography, database publishing, consultancy and courses in the field of graphic software.

Characteristics of ICT demonstrate why convergence in the information and communication industry is now different in quality from the conglomerates of more or less random media activities, which came into being in an earlier period. The fundamental effect of ICT is the fading of the distinctions between lines of business, and that is why the number of multiple or mixed media companies will increase, which will focus on different media, more or less side by side, and of companies specialising in multimedia in the narrow sense.

This analysis of convergence may give rise to two misconceptions which should be avoided. The first is that all media companies will turn into multimedia companies. Although the share of multimedia in the media market will continue to grow, the traditional media will go on serving a substantial market, and the majority of companies will go on focusing on their core business of mono media (or mixed media). However, for certain sectors, like pre-press (or rather, pre-publishing), and the publishers of scientific and professional information, the trend towards multimedia products and services will be dominant. Secondly, the term multimedia companies should not imply that a sector of companies is emerging which focuses exclusively and entirely on the production of multimedia. Taking into account the multidisciplinary activities which go into the making of a multimedia product or service, it is also very well possible for a multimedia firm to offer clients such activities as graphic design and communication consultancy. In addition, the multidisciplinary character of a multimedia product or service is a reason why firms with complementary expertise can choose to collaborate in networks which enable them to concentrate on their core activity and yet be able to enter the new market for multimedia. This topic will be explored in the next section.

3. Network organisation in multimedia production

The logic of networks is regarded as a distinctive feature of the information economy (Castells 1996). The organisational changes of the last three decades were, in retrospect, oriented towards enabling firms to better cope with the uncertainties with which they have been

confronted because of the fast pace of change in the economic, technological and political environments. Network logic in its various forms proved not only able to enhance the firm's flexibility in production and management, but it also seems to be in accordance with the characteristics of the informational economy, according to Castells (1996, 171): "the successful organisations are those able to generate knowledge and process information efficiently; to adapt to the variable geometry of the global economy; to be flexible enough to change its means as rapidly as goals change, under the impact of fast cultural, technological, and institutional change; and to innovate, as innovation becomes the key competitive weapon." The network enterprise, in Castells' view, "makes material the culture of the informational/global economy: it transforms signals into commodities by processing knowledge" (Castells 1996, 172). In the case of multimedia production this characterisation certainly holds, as we will see.

The production and distribution of multimedia products and services requires the contribution of various disciplines, which have a role in elements of the value chain designated as content creation, production, packaging and distribution. (Dialogic 2000; Leisink, Teunen, Boumans 2000). Content is essential and journalists, writers, photographers, designers, composers, video producers, museums and libraries are among the main actors to create content for multimedia. Production of parts of a multimedia product/service may bring in some of the former actors such as video producers, and involve others such as software programmers and developers, database and information system engineers, advertising agencies and reproduction firms. Packaging is the domain of publishers, broadcasting companies, internet service providers and the like. Distribution is to be distinguished into distribution of off-line multimedia products by music-, book- and computer-shops (as well as other sorts of shops) and distribution of on-line multimedia by telecom- and cable-operators and internet access and service providers.

Many of these disciplines were and are involved in the production of traditional media such as books, magazines, (video) films and commercials, and in the production of these, networking has been 'a way of life' for a long time (Euser, Wissema 1989; also for instance Campling 1995; Leisink 1998; Stanworth and Stanworth 1995; Storper 1994). The reasons for this way of working lie in the reduction of direct production and overhead costs, the temporary nature of projects and the creativity of highly specialised, small, non-bureaucratic enterprises. One can, therefore, expect a similar logic of networking firms in the production of multimedia products and services, and even more than in the case of traditional media, because in addition to creative and commercial disciplines — as in the production of traditional media — information technology experts are to be in-

involved. This makes collaborative production by firms with complementary expertise, more attractive when entering the new multimedia market than a non-collaborating strategy, because a single firm has to expand its traditional expertise into a new domain to offer full service. The latter may be an option for a large media firm, but the great majority are small firms for which the investments will be too great and the market too uncertain to expand by themselves.

Thus it appears theoretically plausible to expect a model of collaborative production of multimedia by networking firms. This collaborative production can obviously benefit from the facilities offered by information and communication technologies. Technologically there are no constraints on the choice of networking partners (as long as their systems are compatible), but, given the indications that multimedia production appears to be concentrated in regional clusters (see Braczyk, Fuchs, Wolf 1999a), this thesis needs closer examination.

Since the 1970s, various experiments involving computer supported co-operative work have been carried out, the aim of which was to explore the possibilities of distributed collaboration and the effects of mediated interaction on the performance of teams (for instance Houtsma, Schot 1996; Van der Velden 1995). Computer supported co-operative work is based on audio, video, computer and telecom technologies which facilitate co-operative decision-making, design, authoring, activity co-ordination and so on. Group decision support systems, among other modules, offer tools for generating ideas which can be used in brainstorming sessions, and co-operative design tools enable different people who work at different locations, for instance, to jointly produce a design for a civil engineering or architectural project. Evidently such projects resemble the kind of collaborative work that is needed for a multimedia project.

The performance of teams which work face-to-face in brainstorming sessions appeared to be no better in terms of the quantity and quality of ideas that were generated, than of virtual teams which consisted of people at various locations who co-operated through information and communication technologies. Tasks which involve the exchange of information or the solution of problems that are not too complex can be carried out at distance without loss of quality. However, tasks which have a complex character, or for the execution of which interpersonal relationships are important, are better performed by teams co-operating face-to-face, than by virtual teams, because audio and video technologies do not equal face-to-face communication in the exchange of verbal and notably non-verbal information which is the main channel for messages concerning interpersonal relationships (Ten Horn 1993; Van der Velden 1995). This latter handicap manifests itself particularly in teams that are just starting to work together.

The study of results of computer supported co-operative work supports the thesis that, in general, physical distance is technologically no longer a constraint for co-operation between people. Particular circumstances such as the complexity of the task and the familiarity of the people who are to co-operate with each other require adaptive strategies of these people in order to achieve their project's goals (Ten Horn 1993, 190-191; Van der Velden 1995, 91). One may thus, in a technological sense, expect networking arrangements which are not geographically bound. The improvements in telecommunication technologies which facilitate these networking arrangements have prompted some authors such as Negroponte and Cairncross to predict the decline of cities. Because of improved telecommunication facilities face-to-face contacts would no longer be necessary and thus the role of the city as a natural location where people can meet and communicate at little cost in terms of time and money, would disappear. Every city or region would in principle have equal chances in attracting firms and people, if linked to these telecommunication networks, and thus the economic and cultural dominance of the large metropolises would decline (Van Geenhuizen 2000; Van Winden 2000).

The importance of geographical proximity, however, and notably the importance of location and concentration in a metropolitan agglomeration has been emphasised by Scott's analyses of the cultural-products industries (Scott 1996, 1999). This importance goes beyond the ever-present pool of audio-visual producers, graphic designers, copywriters, composers, actors and so on, who can be engaged in productions. Regional concentration also enhances the efficiency of transactions and the exchange of information, and promotes learning and innovation processes. Existing training institutions, R&D centres, cultural institutions, clubs and societies make a platform where people meet and exchange ideas and new knowledge. Geographic adjacency, according to Scott (1996, 308), promotes the retention and exchange of information, and intensifies the role of agglomerations "as fountainheads of inventiveness and localised competitive advantages". These strong points of geographically concentrated networks have given the culture industry around Los Angeles its strong position. But in order to maintain that strong position in the increasing global competition, regional development policies are needed. As fields for policy development, Scott (1996, 317-319) sees public investments in technology and design centres providing services specific to the agglomeration; training courses; facilities for capital funding, commercial information and services in fields like financial and personnel administration, especially for small-scale enterprises; and the creation of structures for the co-ordination of local economic development strategies and the creation of basic support in the sector. In this way Scott extends the strong points of the network organisation model from direct operational in-

terests of individual producers, to facilities that can have a supporting role in fulfilling strategic requirements regarding quality and innovation across the sector.

Scott (1996, 307) describes the cultural-products industries of Los Angeles explicitly in terms of flexible specialisation, the term coined by Piore and Sabel (1984) to designate economic operations that are oriented to the production of small batches of output for specialised market niches, and where competitive strategy typically entails constant product differentiation and/or significant levels of customisation. Individual establishments in the cultural-products industries are usually small, the production system is highly susceptible to vertical disintegration because of the permanent uncertainties and instabilities that flow from the competitive environment, and, therefore, cultural-products industries tend to cluster into transaction-intensive agglomerations of specialised firms. This is a clear echo of Piore and Sabel's analysis of industrial districts such as the Northern Italian region of Emilia-Romagna, which are the basis of an alternative production paradigm based on networks of small artisan firms. However, their thesis has met with considerable criticism. Ruigrok and Van Tulder (1995) give an overview of this criticism, of which a point relevant to the analysis of multimedia networks concerns the assumption that industrial district networks are truly horizontal networks consisting of smaller firms of equal strength that co-operate, that have a division of labour among themselves, and that are unable to control the end markets. However, Ruigrok and Van Tulder observe (1995, 31) "if one firm finds a way to improve its position vis-à-vis the remaining firms substantially, or as soon as a large company enters the scene that is able to take over some firms or seize control over the distribution, the nature of the network will change from what one might call an egalitarian network of learning into a hierarchical network of control". Taking account of networks as involving variable dependency relations between the constituent parties in the exchange of goods, capital, technology, information, skills, and/or people, Ruigrok and Van Tulder (1995, 68-77) distinguish between six basic bargaining attitudes of a core firm in a network vis-à-vis the other actors. These include:

- co-operation or competition, when the core firm and the other partners are independent actors who voluntarily opt for co-operation or competition,
- compliance, when the core firm is to some extent dependent on a relatively independent other actor without many possibilities to influence this other actor,
- coalition, when the core firm and the other actor are interdependent actors, who may have conflicting interests in some fields but who strike a coalition in the area where their interests converge,
- direct control, where the other actor is dependent on the core firm but is still able to exert some influence

over the core firm, either because, as a division within the core firm, it can take part in internal bargaining processes and exert some influence on central management decisions, or because, as a formally independent firm it can end the relationship, although at high costs,

- structural control, where the other actor is highly dependent on the core firm.

Scott's theory of the importance of regional concentration for the cultural-products industry thus predicts a regional concentration of multimedia producers, while the amendment of Ruigrok and Van Tulder acknowledges the variability of dependency relations in industrial networks.

The virtual-team theory, which asserts that the technological constraints for co-operation across space are diminishing, and Scott's theory, which emphasises the importance of geographical location and concentration in a metropolitan area, are not necessarily inconsistent. In fact, ICT facilitates flexible production and enables a firm to uncouple activities that used to be spatially integrated, so that, for instance, the firm's head office can now be located in one city, R&D facilities in other cities and production facilities in still other places. An example pertinent to the information and communication industries is the practice of several Western publishing multinationals to contract out their data-entry work to firms in Latin America, Africa and Asia as early as the 1980s because of their low labour costs (Mitter, Pearson 1992). Thanks to telecommunication technologies multiple choices for the location of particular activities exist. However, to the extent that multimedia production fits in with the cultural-products industries that Scott analyses, one would expect that multimedia creation activities are located in metropolitan agglomerations rather than simply at random locations.

The notion of a multimedia industry network (in the title of this article) draws on both the theory of distributed production and the theories of Scott and Ruigrok and Van Tulder. This means that the concepts of distributed production, metropolitan concentration and variable dependency relations have been used as heuristic devices to focus the empirical research of the configurations of multimedia producers. The next sections will present some results of this survey of multimedia firms in the Netherlands in November/December 1999 (Leisink, Teunen, Boumans 2000).

4. Multimedia industry networks in the Netherlands

The process of convergence in the information and communication industry explains why firms from different sectors may be involved in the production of multimedia. Together with the fact that the standard industrial classification system does not recognise the multimedia indus-

try, this implies for the researcher that a selection procedure must be followed to establish the population of multimedia firms, which begins with a decision about the sectors to be included in a survey. Following Michel's model of multimedia production which is based on the core-periphery concept elaborated by Dostal (Michel 1997), the population of firms which could be expected to take part in the creation, production, packaging and (online) distribution of multimedia was established as involving 21 sectors/branches of industry. These include publishing, printing and the reproduction of recorded media (general industrial classification code NACE 22), telecommunication services (NACE 642002, 642003), software and computer services (NACE 72101, 72102, 722, 724, 726), public relations (NACE 74142), advertising (NACE 74401), photography (NACE 74811), broadcasting (NACE 922), audio-visual services (NACE 92111, 92112), news and journalist agencies (NACE 924001, 924002).

The standard registration of firms at the Chambers of Commerce was used to determine a random sample per sector, both for the category of firms with less than five employees, and for the category of firms with five or more employees. The number of firms selected was established with a view to reaching at least 200 respondents (for reasons of statistical reliability); the small firms were approached through a postal questionnaire and the firms with five or more employees were contacted for a telephone interview. For several reasons — the small number of firms in some sectors, lack of co-operation because of the frequency of research, all sorts of practical reasons — it was not possible to get at least 200 respondents for every sector of industry. In sum 1169 firms with less than five employees returned the postal questionnaire and 1261 firms with five or more employees took part in the telephone interview.

Since the selected sectors of industry obviously consisted of firms which were dedicated to one or more media (mono media or mixed media firms) but not to multimedia in the narrow sense of the definition (confer the convergence section of the article), the postal questionnaire and the telephone interview began with a clarification and examples of multimedia in the sense of the definition and subsequently with the filter question if the firm contributed to the production of multimedia in this specific sense. Almost forty per cent of the small firms and one third of the bigger firms appear to contribute to multimedia production in one way or another, including for instance the photographer who supplies pictures. To establish more exactly the core of multimedia firms, a secondary analysis was made on the basis of certain core activities for a multimedia production, such as conceptualisation, graphic/interactive design and providing internet-services, and on the basis of these activities representing more than half the firm's annual turnover. Extrapolation on the basis of the results of this secondary analysis indi-

cates that about 4500 firms employing about 16000 employees may be considered as belonging to the core of multimedia production. In absolute terms, most of these firms belong to the branches of advertising agencies, IT-firms (= software and computing services) and producers of (video) films. Many firms are small, and about 85 per cent employ no more than five employees.

A first indication of the regional concentration of multimedia firms can be obtained on the basis of the distribution of firms over the twelve provinces. A quarter of all multimedia firms are located in the province of North Holland, with the centres of Amsterdam and Hilversum, which is the heart of national broadcasting in the Netherlands. The province of South Holland, with Rotterdam as its commercial centre and The Hague as its government centre, houses 21 per cent of all multimedia firms. North Brabant houses 16 per cent of multimedia firms, an important centre being Eindhoven with Philips and many other high-tech firms as well as a technical university. Finally the provinces of Utrecht and Gelderland are host to 11 and 10 per cent of multimedia firms respectively, whereas the other seven provinces score percentages of one to four per cent each. These data indicate that the great majority of multimedia firms (83 per cent) are located in the west and the centre-south of the country. A rough indicator of the difference in the degree of geographical concentration of the multimedia industry and of the total economy can be obtained by comparing the percentage of multimedia firms with the percentage of all firms per province. The five provinces that are host to 83 per cent of multimedia firms, house 76 per cent of all firms which are registered by the Chambers of Commerce (January 2000). To be more specific, three provinces have a comparatively higher concentration of multimedia firms: North Holland houses 25 per cent of multimedia firms versus 20 per cent of all firms, Utrecht houses 11 per cent of multimedia firms versus 8 per cent of all firms, and North Brabant houses 16 per cent of multimedia firms versus 15 per cent of all firms.

From an economic point of view, however, provinces are arbitrary entities with a public administrative function, whose borders are of no relevance to the clustering of economic activities. A closer look into the geographical

basis of multimedia firms on the basis of the postal codes which are known of 400 firms reveals that about forty per cent are located in a corridor with Amsterdam and Hilversum as its basis and with a west wing towards Hoofddorp/Haarlem and a southward wing towards Amersfoort/Utrecht/Nieuwegein. This multimedia corridor which crosses the provinces of North Holland and Utrecht, illustrates more distinctly the degree of geographical concentration because it shows that multimedia firms rather than being scattered over the province are actually located in a relatively narrow geographical band. The same core area was demarcated by Naylor (1999, 199-200) on the basis of 1997 data for Internet suppliers. Despite efforts of provincial and local authorities in the eastern and northern parts of the Netherlands to attract ICT-firms and create their own Silicon Valley (Van Geenhuizen 2000), their share of multimedia firms is marginal.

The next question is whether multimedia firms co-operate in production networks and where their networking partners are located. This question can be answered with the information of the survey questionnaire. The analysis will focus on firms in the sectors of publishing, advertising, prepublishing, audio-visual production, software development and IT-business consultancy, because these firms play a central role in the multimedia production chain of content creation, production including IT-enabling activities and e-marketing, and are represented in the response in fairly sufficient numbers. Only firms which are actually involved in multimedia production will be included in the analysis and as a reference mark the mean score of the multimedia firms from all sectors will be indicated.

In the production of multimedia, the networking logic is clearly recognisable. Table 1 indicates that two thirds of all firms outsource part of the job of a multimedia production to one or more subcontractors. Publishing houses, advertising agencies and audio-visual producers score relatively highly on outsourcing 'often', because they are usually the main contractor of a multimedia production. The job they outsource will be, for instance, programming and software development or sound, pictures and special effects. The relatively low scores by publishers, advertising

Table 1

Firms by frequency of outsourcing a job to a subcontractor (%)

Sectors	Never	Occasionally	Often	Unknown	N
Publishing	20	36	33	11	45
Advertising agencies	26	43	28	3	153
Pre-publishing	43	40	13	5	40
Audiovisual Production	21	50	28	1	95
IT	41	43	15	1	293
MM firms of all sectors	33	42	22	2	847

Table 2

Are subcontractors located in the region of the main contractor? (%)

Sectors	(Almost) all	Some are, some are not	(Almost) none	N
Publishing*	34	38	25	32
Advertising agencies	73	19	7	109
Pre-publishing	48	33	19	21
Audiovisual Production	58	31	11	74
IT	50	40	11	171
MM firms of all sectors*	53	33	12	546
* percentages of publishing firms and MM firms of all sectors do not add up to 100% because some firms do not know their subcontractors' locations				

agencies and (video) film producers on 'never' outsourcing a job indicate that few of them can offer full-service in a multimedia production. By contrast the high scores of pre-publishing and IT-firms on 'never' putting out a job to contract reflects the fact that they are usually not the main contractor but a supplier of a designated job.

The postal codes showed that multimedia firms are located in some selected regions. Now that it is clear that two thirds of them contract out part of a multimedia job to a subcontractor, the question is whether the subcontractors are located in the same region as the main contractor. If so, there is good reason to consider the networks as regional production networks. Table 2 shows that more than half the firms that put out jobs to a subcontractor do so to subcontractors in the same region, and one third do so to subcontractors of whom some are and some are not located in the same region. Only twelve per cent of all firms put out a job to subcontractors of which hardly any are located in the same region.

Advertising agencies and audio-visual producers score relatively high on subcontractors in the same region, publishing houses outsource jobs less often than average to subcontractors in the same region, and more often than average to subcontractors of which hardly any are located in the same region. One conclusion can thus be that the majority of multimedia firms operate in regional production networks. In addition, the fact that on average 86 per cent of all firms indicate that they have a (more or less) stable network of suppliers is an empirical illustration of the picture which Scott draws of regional networks as platforms where people meet and exchange ideas and new knowledge.

The features of multimedia firms which have been examined so far correspond largely with Scott's analysis of concentration and networking in a metropolitan agglomeration. Given the fact that the great majority of firms are small firms, another feature of Scott's picture can now also be expected to hold, namely that the networks are truly horizontal networks consisting of smaller firms of

equal strength that co-operate. The previous section set out that this type of relationship between the partners in a network would be included as one variant in a broader set of dependency relationships between the partners in a network. A problem for the researcher is that dependency relationships are not easily identified. A direct question meets with subjective mechanisms varying from replies by the dominant party who does not like to admit that it is forcing another party to do something, to those given by the dominated party who does not like to recognise the fact that it has little or no choice; subjectively, both parties prefer to entertain the idea that they are independent actors who have entered into co-operation voluntarily. Thus the researcher would like to find some indirect measures of dependency relations as well. In this research, two other indicators were used as an approximation of dependency relations. The size of the subcontractors, measured by annual turnover, relative to the main contractor was one indicator. It is assumed that when some subcontractors are larger and others are smaller relative to the main contractor, the network approaches the type of horizontal network which Scott has in mind. The other indicator is the ownership of the intellectual property rights of the job that the subcontractor contributes to the multimedia product. It is assumed that in a horizontal network every partner, including the subcontractor, is the owner of the intellectual property rights of its own production. These three indicators of the character of the network will now be examined.

Table 3 shows that the great majority of firms regard the other firms to which they contract out a job as completely independent and in a position of being able to choose voluntarily to do the job. The characterisation of the network relationships as interdependent holds for 12 per cent of the firms and only 3 per cent regard the subcontractor as dependent. Interestingly, when the same question is asked of firms in their capacity as subcontractors, that is, if they are asked to characterise the other firms to which they supply work as a subcontractor, the same description is given.

Table 3

Description by the main contractors of the position of their subcontractors in relation to themselves (%)

Sectors	Independent	Interdependent	Dependent	Other	Unknown	N
Publishing	77	10	-	13	-	31
Advertising agencies	82	12	5	2	-	109
Pre-publishing	81	14	-	-	5	21
Audiovisual Production	90	8	-	1	-	72
IT	80	15	2	2	2	168
MM firms of all sectors	82	12	3	2	1	539

Assuming that the network relationships approximate a kind of horizontal network if, from the point of view of the main contractor who puts out a job to a subcontractor, some firms are bigger and others are smaller, measured by the size of their annual turnover relative to the main contractor, then just under half of the firms participate in such equal horizontal networks. Almost 30 percent participate in networks in which their subcontractors are (almost) all larger and almost 20 per cent participate in networks in which their subcontractors are (almost) all smaller. Table 4 presents these results in more detail.

When the same question about relative annual turnover is put to firms in their capacity as a supplier to a contractor, the results in the category of 'some larger, some smaller' hardly change: 43 per cent of subcontracting firms describe their contracting partners as such. The main change is that as a subcontracting firm 47 per cent of all firms indicate that their contractors are (almost) all larger, and 5 per cent of all firms describe their contracting firms as (almost) all smaller and 5 per cent do not know. One should be careful, however, to interpret this finding straightforwardly in the sense that the former refers to subcontractors who are dependent, or at least not dominant, and the latter refers to subcontractors who are independent or at least dominant. Annual turnover is of course an indicator of financial power, but small firms can have essential assets for a production which can give it a position of relative independence vis-à-vis a bigger main

contractor. Examples of such essential assets are the expertise of data-compression or encryption techniques, or of on-line billing systems which guarantee authentication and privacy. Nevertheless, what comes to the fore when these data are examined is that the proportion of firms which can be described as independent and as voluntarily choosing contractor-supplier co-operation which can be characterised as a horizontal network is less than the 82 per cent (in Table 3) that characterise themselves subjectively as completely independent and voluntarily co-operating.

The final indicator of the nature of networking relationships is the ownership of the intellectual property rights of the job which was put out to a subcontractor. Table 5 shows that from the point of view of the contractor, two thirds of the contractors have the intellectual property rights of the job that was done by the subcontractor while only 11 per cent of the contractors indicate that the subcontractor owns the intellectual property rights of his job.

When the same question was put to firms which operate as a subcontractor, 40 per cent of them indicated, from their point of view as subcontractor, that the supplier owns the intellectual property rights and 36 per cent that the contractor owns the intellectual property rights. Leaving aside the legal intricacies of the demarcation of intellectual property rights, the fact remains that subcontractors own the intellectual property rights of their work far less

Table 4

Description by the main contractor of the volume of turnover of their subcontractors in comparison with the main contractor's own turnover (%)

Sectors	(Almost) all larger	Some larger, some smaller	(Almost) all smaller	Unknown	N
Publishing	25	34	28	13	32
Advertising agencies	21	50	24	6	109
Pre-publishing	33	29	29	10	21
Audiovisual Production	31	53	7	9	74
IT	29	47	17	7	172
MM firms of all sectors	28	47	18	8	546

Table 5

Ownership of the intellectual property of the outsourced job according to the main contractor (%)

Sectors	Contractor	Subcontractor	Variable	Client/Other	Not applicable	Unknown	N
Publishing	68	6	-	9	6	10	31
Advertising agencies	69	11	4	5	7	5	107
Pre-publishing	62	14	-	5	14	5	21
Audiovisual Production	77	9	3	1	4	1	70
IT	60	13	2	9	13	2	167
MM firms of all sectors	66	11	4	7	9	3	533

frequently than would be expected in voluntary and equal relationships.

While about 80 percent of all firms — both contractors and subcontractors — describe their own position as independent and their participation in the network as voluntary, the conclusion on the basis of relative size of turnover and of ownership of intellectual property rights appears to be that no more than half of all firms take part in networks that may be regarded as equal.

5. Discussion and regional policy implications

The majority of firms that contribute to multimedia production participate in regional production networks. A network of major importance is located in the Amsterdam-Hilversum corridor, where national broadcasting, universities, art colleges, cultural centres and major firms (for instance Endemol, Lost Boys, Lucent, Microsoft, NOB Interactive, Reed Elsevier, Sony, Valkieser, Wolters Kluwer) have their home as well. Other regional networks centre around major cities such as Rotterdam-The Hague and Den Bosch-Eindhoven. Apart from the regional concentration of these multimedia firms they also interact in contractor-supplier networks, they meet in clubs such as Amsterdam New Media Association and Businessclub Highway 2066, in short, these regional networks have many of the characteristics which Scott describes for the cultural and multimedia industries in the Los Angeles area. In fact, 60 per cent of all multimedia firms subscribe to the statement that a regional concentration of firms and institutes in the areas of education, R&D, art and culture is important for a successful development of multimedia production with a view to creating a climate which is favourable to innovation and creativity; publishing and IT-firms appear to subscribe to this view less than average.

An interesting issue is why so few firms appear to take advantage of the global co-operation possibilities of ICT-networks. Taking as an indicator the share of multimedia firms whose subcontractors are not located in the same region, we find that an average of only 12 per cent of firms network on a larger geographical scale, with publishing houses scoring 25 per cent and advertising agencies

scoring only 7 per cent. The difference in product markets is relevant for explaining the difference between publishing houses and advertising agencies. A substantial number of prominent advertising agencies in the Netherlands have always been concentrated in Amsterdam and other centres of economic activity, because their main business is business-to-business and they want to be located close to their clients (cf. Naylor 1999). In addition, since much of their business is just-in-time, they have always made use of prepress companies in their direct neighbourhood with whom they maintain stable working relationships, with the effect that one of the biggest prepress companies in Amsterdam decided to provide 24-hour service. On the other hand, publishers — particularly those such as Reed Elsevier, Wolters Kluwer, and Swets Blackwell, who serve the segment of scientific, professional and business information — are content-organisers and increasingly operate in global markets. They are also less locally bound in terms of the content-creation and production activities which they organise. An interesting example is Reed Elsevier which had its own prepress facility in the Netherlands for data conversion and digitised graphics, but in 1994 first decided to subcontract part of its prepress work, and in 1997 decided to contract out all prepress work to SPI Technologies in the Philippines, where work can be done at a quarter of the cost in the Netherlands (Leisink 1999). SPI Technologies also serves other global publishers such as Wolters Kluwer and Bertelsmann. This example illustrates the importance of labour costs as a factor in the global relocation of work which is enabled by ICT.

Another factor which contributes to the geography of networking is trust between networking partners. Its importance is illustrated by the stable relationships which the research found in almost 90 percent of all firms which put out jobs to subcontractors. In fact, stability is a means of reducing uncertainty as to how a job will be done. For Reed Elsevier, the growth of a global network was facilitated by the fact that Reed Elsevier had been able to find out about SPI Technologies by first bringing SPI into its own prepress facility and later selling its facility to SPI. In general, since it is easier to create trust-based relationships when one can meet face-to-face in a local restau-

rant or business club than globally on-line, regional networks have an extra *raison d'être* which is especially relevant in a newly emerging industry like the multimedia industry where working patterns have not yet been established (see also Braczyk, Fuchs, Wolf 1999b, 399).

The examples of Silicon Valley and Silicon Alley have inspired regional authorities in attempting to create a favourable business context, and to stimulate regional economic development by attracting ICT firms. The importance which regional authorities attach to having a share of the multimedia industry can be understood from an economic point of view, both with respect to the importance of the multimedia industry itself and with respect to its strategic importance for the regional economy as a whole (see Braczyk, Fuchs, Wolf 1999a). In the Netherlands various examples of such regional development initiatives exist, for instance in Amsterdam (Bouwman, Jansen, Peelen 2000; Peelen et al 1998), Hilversum (Vis 1998), Rotterdam (Naylor 1999; Van Vliet 2000) and Twente (Wierstra, Jacobs, Kuijper 2000). In addition, the national government takes an interest in stimulating regional economic policies for its aim to promote high-tech entrepreneurship and to turn the Netherlands into one of the leading ICT regions in Europe. For this reason, the Ministry of Economic Affairs launched the so-called Twinning Policy in 1998, which involves: creating twinning centres that offer office accommodation, facilities (such as telecom infrastructure) and business coaching to promising ICT start-ups; establishing funds for financial participation in start-ups and young firms on a public-private basis; and offering a network of (inter)national contacts which can be used by start-ups for advice and for networking with suppliers, distributors and so on (Hulsink, Elfring 2000). Since 1998, three twinning centres have become operational in Amsterdam, Eindhoven and Twente, which were selected as location because of the presence of ICT research institutes and because of local firms' willingness to invest and to contribute to creating a climate favourable to high-tech entrepreneurship. The economic development policies of local and regional authorities focus on areas similar to the twinning policy. Local authorities, for instance in Amsterdam and Twente co-operate with the Chambers of Commerce, universities and large ICT firms in developing high-tech business and science parks. Rotterdam invested in the renovation of old port buildings offering 46 audio-visual firms and artists office accommodation and facilities. Local authorities are intent on attracting firms (Amsterdam: Cisco) or institutes (Rotterdam: The National Image Institute for Photographic, Film, Video and Multimedia Art) which can enhance their ICT or multimedia profile. Chambers of Commerce (for instance Amsterdam and Hilversum) initiate research into their region's economic structure and opportunities because of a need for information on which strategic regional economic policy plans can be based.

A full assessment of the extent to which regional development plans have been effective is beyond the scope of this article. However, it would seem that such plans reach only a very small part of the target group, as many multimedia firms tend not to be aware of actual plans by public authorities to support the production and use of multimedia. In our research, about 40 per cent of all multimedia firms have no information and opinion about such plans by public authorities, 25 per cent have a positive and 15 per cent have a negative opinion about such plans, while about 20 per cent are neutral in their opinion. Apart from the fact that government policy plans are not widely recognised, firms also criticise the implementation of those policies as being too bureaucratic and not well tailored to their needs.

In addition, the limited set of instruments (office premises, facilities, contacts) which are used are not up to the ICT policy goals that local and regional authorities claim to pursue. Current regional ICT policies are criticised for a lack of strategic vision on what are promising economic opportunities that tally with existing regional strengths, on the basis of which a selective policy of supporting start-ups and attracting new businesses can be built (Bouwman, Jansen, Peelen 2000, 327; Van Vliet 2000, 349; Van Winden 2000, 115-116; Wierstra, Jacobs, Kuijper 2000, 287). Current policies are also criticised for not investing more energy in building active encompassing regional networks of relevant actors such as large firms, small and medium-sized enterprises, Chambers of Commerce, research and knowledge institutes, and so on (Bouwman, Jansen, Peelen 2000, 323; Wierstra, Jacobs, Kuijper 2000, 289). Finally, current policies touch on only some of the broader structural problems which multimedia firms recognise as threatening to impede the successful development of their business. In the survey, 46 per cent of all large multimedia firms designated the lack of well-qualified staff as the main problem for the successful development of their business. Of the small firms with less than 5 employees, 27 per cent mentioned this lack of qualified staff, which took second place to the lack of adequate knowledge by clients, which was mentioned by 30 percent of the small multimedia firms. Other problems include lack of venture capital, the multitude of firms in the market, the management of the firm, the absence of standards for quality and reliability of service, and so on.

It is quite clear that public authorities cannot play a role in all these respects. For some of the problems which were mentioned, such as the lack of quality standards, it is rather the job of a sectoral organisation of multimedia firms to initiate a joint approach, and public authorities can at best facilitate such initiatives indirectly. For other problems which were mentioned, notably the lack of well qualified staff, state agencies can play a larger role than they have done thus far. In fact, all sorts of regional vocational and higher professional training colleges and universities

have started offering 'multimedia' courses without much external (tripartite) examination of the qualification requirements (for instance, the level of qualification for different jobs, the issue of generalist or specialist qualifications and the issue of technical and personal qualifications). Apart from a lack of co-ordination in the professional sphere, public authorities have not taken initiatives at institutional co-ordination, for instance in the sense of promoting collaboration between colleges with different disciplines to create a joint flexible modular curriculum and by promoting exchange and co-operation programmes between colleges, research and development centres and firms (although large firms have shown their interest in such co-operation programmes which help to solve their problem of lack of qualified employees, but which contribute simultaneously to the establishment of a flow of information between education and industry).

6. Conclusion

In terms of the proportion of the population connected to the Internet, and the growth of e-commerce, the Netherlands are regarded as among the more advanced EU member states. The development of an information economy goes along with a growing multimedia industry, which appears to be organised like the regional industrial clusters that Braczyk, Fuchs and Wolf (1999a) present, and which is to a large extent concentrated in metropolitan agglomerations in much the same way as Scott (1999) has demonstrated for the multimedia industry in the Los Angeles area. Multimedia production is, however, not exclusively embedded in the Randstad-agglomeration (Amsterdam, Rotterdam, the Hague, Utrecht) in the western part of the Netherlands. An important network is located in the Eindhoven region and a smaller one in the peripheral region of Twente. There is also a modest proportion of firms that operate in global networks, and this may increase with the growing number of key firms which take the global market as their point of reference.

Most multimedia firms have a positive opinion about the development of their business, yet they perceive a number of factors as impeding successful development. These factors such as the lack of qualified staff are largely collective in nature. An obstacle to coping with such collective problems is the absence of organisation(s) representing the multimedia industry. The associations that currently exist are either organisations representing 'traditional' sectors of industry, such as advertising and publishing, or local clubs which draw a varying attendance whose interest is primarily in making business contacts, while young starters have little interest in institutional organisation at all. Since there is little prospect of organising comprehensive institutional representation in the short term, there is an important role for public authorities and agencies to play in establishing regional platforms where companies, staff, regional agencies, research and educational institutions and other parties can meet and discuss matters with one another and with the regional policy-makers. Platform meetings can generate information which forms an important input for a strategic vision on the region's strengths and opportunities. In addition, meetings and activities of relevant regional actors will contribute to creating a sense of joint interest, commitment and trust, which are a basis for tackling broader problems of the development of the multimedia industry in the region. It is true that developing policies in these fields is more difficult and requires a longer time-span than offering financial or locational incentives to firms looking for a working accommodation, but while the latter approach has promoted short-term competition between regions, the former can contribute to an industry-wide structural development policy.

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Zusammenfassung

Networking in der Multimediaindustrie und regionale wirtschaftliche Entwicklungspolitik am Beispiel Hollands.

Die aufkommende Informationswirtschaft ist mit Prozessen verbunden, die auch die Informations- und Kommunikationsindustrie grundsätzlich ändern. Einer dieser Prozesse — Konvergenz — bringt die Multimediaindustrie als dynamischer Kern dieser Informations- und Kommunikationsindustrie hervor. Die Organisation der Multimediaproduktion ist ein exemplarisches Beispiel des zu der Informationswirtschaft gehörenden neuen Paradigmas der Organisationskonfiguration, d.h. der Networkorganisation. Obwohl angenommen wird, dass Informations- und Kommunikationstechnologien den Standort der Firmenaktivitäten weniger wichtig, wenn nicht irrelevant machen, sind Multimediafirmen in der Regel regional konzentriert, und versuchen viele regionale Behörden, die Multimediaindustrie zur treibenden Kraft ihrer regionalen wirtschaftlichen Entwicklung zu machen. In diesem Artikel wird dieses Paradox sowohl aus theoretischer als auch aus empirischer Sicht behandelt.