Applying an innovation cluster framework to a creative industry: the case of screen-based media in Ontario

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Abstract

The extension of the innovation cluster approach to creative industries is relatively recent. In the present article we discuss the application of a formal cluster benchmarking model to a creative industry, the Ontario screen-based media industry (here defined as the film, television, and interactive digital media [IDM] sectors), the results of which provide insight into the ways that creative and technology-based clusters differ from one another. We discuss five challenges of approaching a creative industry in terms of an innovation cluster: 1) accurately understanding the nature and significance of innovation processes in cultural industries; 2) facilitating the linkages, spillovers, and externalities that are believed to be of strategic significance; 3) factoring in the cluster's numerous trans-local external linkages; 4) innovation policy measures for labor, entrepreneurs, and small firms in media industries; 5) identifying cluster-specific implications of non cluster-specific policy measures.

Introduction

Industry "clusters" (and analogous concepts referring to geographical concentrations of groups of firms and supporting institutions) represent a key area of interest among innovation and economic development policymakers, and over the past two decades clusters have come to figure prominently in innovation policies. In most industrialized countries, governments at every level of jurisdiction have implemented programs and policies to strengthen the development and improve the performance of industry clusters. Several factors explain this expansion of cluster approaches. They are an improvement over older sectoral approaches to economic development, but remain sensitive to a jurisdiction's sectoral characteristics. Cluster approaches are also attractive to policymakers in local and regional jurisdictions because they address vital local economic interests, providing visibility and saliency in the eyes of local political constituencies. Furthermore, clusters are attractive to national policymakers because they serve to regionalize national policies, avoiding problems of "one size fits all" programs. The OECD, a leading advocate of cluster approaches to innovation policy, notes that clusters "represent a manageable system for governments to implement the NIS [National Innovation System] Framework by complementing horizontal policies with more targeted and customised policies" (OECD 1999, 2002). Despite the many unresolved questions concerning the accurate definition of clusters and the most effective ways to design and execute cluster approaches to innovation policy, cluster-based policies remain very popular (OECD, 2008).

Indeed, while cluster policies were originally theorized and popularized in the context of technology-based development, they are only now beginning to be applied in non-technology sectors, underscoring their attractiveness to policymakers in a variety of industries. By extending the cluster approach to creative industries, as has the Ontario government, important questions related to innovation, economic growth, and cluster dynamics come to the fore.

Although industry clusters exist in a wide variety of structural configurations, the key characteristics of clusters are the numerous linkages among geographically proximate firms through market- and non market interactions, as well as linkages with geographically proximate supporting firms and institutions, especially suppliers, business services, research institutions, and educational institutions. In principle, therefore, a cluster approach for creative industries is viable and consistent with the large scholarly and practitioner literature that has emerged and investigates clusters in many locations and industries.

The purpose of this article is to examine more closely the suitability of a cluster approach to creative industries. In so doing, we relate the results of applying a formal innovation cluster benchmarking framework to a creative industry, the Ontario screen-based media industry (which we here define as the film and television production, post-production, and interactive digital media [IDM] sectors). The cluster benchmarking framework was developed in association with Canada's National Research Council for purposes of monitoring innovation clusters, and it was subsequently applied to eight primarily technology-based clusters in Canada. In this paper we briefly describe the cluster framework and the principal characteristics of Ontario's screen-based media cluster, highlighting how they differ from technology-based clusters. This discussion provides a background for an analysis of the five challenges of approaching a creative industry in terms of an innovation cluster. These challenges are: 1) accurately understanding the nature of innovation processes in cultural industries and assessing the actual competitive significance of pervasive product innovation in these industries; 2) facilitating the linkages, externalities and spillovers that are believed to be of strategic significance, especially linkages between IT suppliers and media firms, between media firms and R&D institutions, and between media firms and the investment community, and localized aesthetic spillovers into other cultural industries; 3) factoring in the cluster's numerous trans-local external linkages; 4) innovation policy measures for labor, entrepreneurs, and small firms in media industries; 5) identifying cluster-specific implications of actual or potential policy measures for innovation in an industry in which policy influences are widespread.

The Ontario screen-based media cluster

In its least stringent formulation, the term "cluster" refers to an agglomeration of firms in a particular location, implying some degree of local economic specialization. In its stricter formulations, the cluster concept emphasizes not just collections of individual firms in the same industry in the same location, but functional linkages among firms and supporting institutions in a locally configured value chain of vertical relationships among firms and suppliers of inputs and support services. The cluster's value chain constitutes a local innovation system in which some of the resources and production capabilities that support firm-level learning and innovation are distributed in the firm's geographically proximate industrial, institutional, and social environment. Local horizontal relationships in the form of inter-firm rivalries, "untraded interdependences" such as collaborative behaviour (co-bidding on contracts, for example), shared self-image, and externally recognized brand or style are also important attributes of industry clusters (Benneworth et al., 2003; Martin and Sunley, 2003; Palazuelos, 2005).

Media industries are highly clustered, and the clusters are practically always in located in major urban areas. A recent review of the English-language research literature on screen-based industry clusters identified about one hundred papers that investigate about two dozen film/TV clusters and an equal number of interactive media clusters (Davis, 2008; see also Picard, 2009). Most of the documented screen-based media clusters are located in major cities of Western Europe, North America, and English-speaking Asia or Australasia – city regions that have developed influential commercial media industries that export beyond the city region, or internationally. This is also the case in Ontario. More than three-quarters of all firms in Ontario in the film and television and IDM industries are located in the Toronto metropolitan region.

Toronto is the only "beta" or second-tier media city in North America (Krätke, 2003) and it is the third-largest film and television production center in North America. The Toronto film and television cluster serves as a platform for outsourced Hollywood productions, attracting several

hundred million dollars of service production annually to the province. However, service production is not its principal vocation. The Toronto cluster derives upwards of two-thirds of its revenues from indigenous media production, largely television programming. Thus, unlike the several North American film and television clusters that have developed as satellites of Hollywood through production outsourcing, the Ontario film and television cluster is fully articulated, encompassing the entire range of activities and services required to conceive and produce film and television products and distribute them to customers. The Ontario film and television cluster includes capabilities to distribute media products to customers through broadcast and specialty television channels as well as via the Internet. In its range of capabilities and in its scope of decision-making capabilities, the Ontario film and television cluster is a fully independent and fully developed cluster, reflecting Toronto's traditional role as English-speaking Canada's media capital. The Toronto media cluster is, however, is much smaller than the predominant North American media clusters in Los Angeles and New York. It consists of several hundred specialized production and post-production firms as well as the major broadcasters and media distributors of English-speaking Canada, specialized support institutions such as postsecondary training institutions, hundreds of specialized service providers such as law firms, sound stages, and guilds, several thousand microenterprises, and a specialized labor pool numbering in the tens of thousands. This configuration is typical of film and television clusters. The revenues of this sector are estimated to be about $2 billion.

Ontario's interactive digital media industry [IDM] has a strong foundation of over 400 core firms, which includes two broad groups of firms. The first group comprises those that develop digital media content, such as entertainment software or web content. The second category captures those firms that enable the use of digital interactive content, including firms that develop Internet applications for visualization of content, and develop software for compressing data. With an emphasis on content creation for entertainment software, e-learning and education, social networking, animation, and information and reference content, the interactive digital media industry is affiliated with the broader creative industry and supported accordingly.

The NRC cluster model

The generic cluster model discussed here was developed for the National Research Council of Canada and employed to measure the strengths and weaknesses of eight industrial clusters to which NRC elected to provide significant R&D services.[1] The model is described in a recent publication (Arthurs et al., 2009) and was developed on the basis that improving the effectiveness of cluster policies requires a map of the underlying innovation system and appropriate indicators to measure changes in its structure and dynamics. Official STI statistics are not sufficient for innovation cluster benchmarking for four reasons: they often are unavailable at geographically disaggregated levels, they are often structured according to established industrial categories, they do not measure most internal cluster linkages, and several years may elapse between their collection and their release by the statistical agency. For these reasons, most policy-relevant relevant indicators must be produced at the cluster level by organizations with interests in the cluster.

At the centre of the NRC model are the cluster firms. They are influenced by the cluster's *current conditions* and collectively they determine the cluster's *current performance*. *Current Conditions* consists of public and private supporting organizations, the competitive environment of customers and competitors, and the factors in the environment of the cluster that influence the behaviour of firms (e.g. availability of qualified personnel, perceptions of the business climate, etc.). *Current Performance* consists of the concepts that indicate how well the cluster is doing - its significance in terms of critical mass, breadth of responsibilities, and reach; its interactions internally and externally to the rest of the world; and its dynamism in terms of innovativeness and growth.

[1] The clusters are: nanotechnologies, nutriceuticals and functional foods, nutrisciences, medical devices, photonics, fuel cells, aluminum, and sustainable construction technologies.

We operationalize *current conditions* and *current performance* into a hierarchy of constructs, sub-constructs, and indicators which we drew from the broad range of characteristics considered important to clustering in the scholarly and policy literature. The measures include the cluster's business characteristics, internal and external linkages, use of public infrastructure, creative behaviour, and market orientation. The cluster model is comprised of six constructs and thirty-four variables, yielding a conceptually grounded and easily replicable set of indicators. Many of the indicators are measured as responses to statements on a five-point Likert scale. Each cluster analysis is populated by responses to telephone surveys, and interpreted with the aid of qualitative interviews with cluster players and a thorough review of existing scholarly and trade literature. In the case of the Ontario screen-based industry cluster benchmarking exercise, more than 200 production, post-production, and interactive digital media firms participated in the telephone survey. Table 1 shows the constructs, sub-constructs, and sub-construct scores for the Ontario interactive digital media and film and television production and post-production sectors. We provide an interpretation of some of these scores below.

Application of the NRC model to a creative industry cluster

Our survey found Ontario's screen-based industries to be a well-established cluster with a number of notable cluster characteristics corresponding to the 'significance', 'interaction', and 'dynamism' constructs in the cluster measurement framework. Foremost among these characteristics is the significance and visibility of the cluster in the regional economy resulting, to a great extent, from its high degree of agglomeration within the Toronto metropolitan region, and even more pronounced, within the inner core of Toronto. A second notable characteristic is the degree of interactions within the screen-based media cluster. A central tenet of cluster theory is that the competitive performance of a clustering industry in a given region is determined in part by the range and quality of interactions among the cluster actors. This emphasis on interaction among firms has been the focus of a large number of government initiatives that seek to create or improve clusters in a range of industries.

The film and television production and post-production industry is networked internally to a much greater degree than the eight technology-based clusters we previously analyzed. Many of these linkages are manifestations not of distributed *technological innovation* processes, however, but of distributed project-based *production* processes that are in widespread use across creative industries. Linkages support a production process organized around specific projects and which relies on a network of freelancers or independents, many of whom are committed to more than one project with different companies at any given time. The third characteristic that warrants comment is the dynamism of the cluster, which reports very high rates of product innovation. Moreover, this dynamism is produced mostly by small firms, some of which are created strictly for the project at hand.

Creative versus technology-based clusters

Results of our survey indicate that the Ontario screen-based media cluster significantly differs from Canadian technology-based innovation clusters (and the film-tv and interactive media clusters differ from each other) in several ways. In the first place, Canadian technology-based innovation clusters are generally highly extraverted – their customers and competitors are not geographically proximate. In contrast, firms in the Ontario screen-based media cluster are primarily oriented toward local and regional customers and competitors. The support provided by Canadian federal and provincial governments allows these clusters to survive in spite of the smaller markets that they serve. Second, the Ontario screen-based media cluster is much larger, in terms of numbers of member firms, than most of the Canadian technology-based innovation clusters that we investigated. The Ontario screen-based media cluster numbers in the several hundreds of firms (excluding the thousands of micro-enterprises), while many Canadian clusters in areas of advanced technology presently number in the few dozens of firms. Third, the Ontario screen-based media cluster has a much stronger identity (consisting of internal and external awareness of the cluster) than many Canadian technology-based clusters. Both the Ontario film and television sector and the Ontario interactive digital media sector

enjoy relatively high internal salience among members and stakeholders, as well as external recognition (though not necessarily as a branded cluster). Fourth, in general, linkages with proximate or distant R&D institutions are much weaker within the Ontario film and television industry than within Canadian technology-based innovation clusters. On the other hand, the interactive digital media industry displays linkages with R&D institutions that are more typical of a technology-based industry. Fifth, neither the Ontario film and tv industry nor the Ontario interactive digital media industry reports deep involvement in community organizations that provide services to members and enable collective action. This may be the result of the primary location of these industries in Toronto, which has notoriously weak business associations and self-help networks owing to its individualistic and competitive business culture. Also, the screen-based media industry regards itself as national in scope. The film and television production and post-production industry, in particular, is sensitive to regulatory arrangements in the broadcast and telecommunications industry and so requires a consistent presence in the national capital, Ottawa. A final difference is that firms in the interactive digital media industry report much stronger growth prospects than firms in the film and television production and post-production industry.

Five challenges in applying a cluster approach to media innovation policy

How does agglomeration enhance innovation, performance and competitiveness at the firm and cluster levels? Here we discuss five key challenges in applying a cluster approach to innovation policy for media industries, drawing on the scholarly literature on clustering in the core screen-based media industries (film, television, and interactive digital media, which are the most studied media industries from a spatial or cluster perspective), and illustrating our discussion with examples from the application of our cluster model to the Toronto screen-based media industry.

1. Accurately understanding the nature of innovation processes in media industries and assessing the actual competitive significance of pervasive product innovation in these

industries

The principal purpose of fostering technology-based clustering is to accelerate innovation throughout the population of member firms, with assumed positive consequences for the competitive performance of members and the cluster as a whole. This model assumes that formal R&D activities are a key part of the novelty-creation process, that R&D spending translates into innovation (understood as the adoption of novel products or process improvements by users), and that innovation translates into superior economic performance. This is why, in innovation surveys, the principal indicators of innovation at the firm level are R&D spending and the portion of revenues generated from products introduced within the past three years. The positive relationship between R&D effort, product innovation, and economic performance is assumed. In this context, film and tv production firms are anomalous because they conduct little R&D yet report very high rates of product innovation, but do not necessarily translate this high rate of product innovation into superior economic performance.

Innovation policy for media industries is complicated by the fact that innovation in electronic media industries is driven by combinations of innovation in three "layers" of the media system: the physical infrastructure layer, the software layer, and the content layer (Benkler, 2006). Each layer is regulated differently and each has its own innovation dynamic. The extension of cultural and creative industry concerns to media innovation usually means, in practice, targeting the content layer and some aspects of the software layer which are unambiguously within the ambit of the cultural and creative industries. Most physical infrastructure and software layer issues are left aside except when they are seen to affect the well-being of the indigenous content production industry. Furthermore, the content production layer lies largely outside the realm of the R&D world. The content layer's equivalents of R&D activities generally do not qualify for R&D tax incentives, nor does this layer maintain linkages with formal R&D institutions except for its more technical needs in digital media.

The content layer is largely unknown in the world of innovation policy, and it does not easily fit

into conventional innovation policy frameworks, which ultimately lead to theories of how technological improvements increase the efficiency of economic production. Content innovation (or creative production) yields experience goods, which create value not through improved production efficiencies but by producing (or enabling the consumer's production of) experience, affect, and meaning. The significance of the emergence of a "creative economy" is in the growing ability of content industries to create economic value through production of tradable and consumable experience, affect, and meaning.

In the past, policymakers have treated creative industries as a welfare sector or as a sector that has no particular effects on other economic sectors. Evidence now suggests that creative industries may be considered economic growth drivers or, indeed, that they may play an even more strategic role in the innovation system as catalysts of variety creation and facilitators of systemic evolution (Potts and Cunningham, 2008). An illustration of the latter role of creative industries is the trans-sectoral impact of design capabilities on innovation (Vinodrai, Gertler & Lambert, 2007). Creative industries (especially when they are enabled by interactive media) also catalyze innovation and entrepreneurial behaviour among consumers, formerly known as the passive audience. Experience goods have peculiar economic properties due to the high uncertainty of demand and, consequently, the extremely important role of quality signalling mechanisms such consumer word-of-mouth networks and critics in the development of markets. The design of effective innovation systems in creative industries will require a clearer understanding of how these industries can create economic and social value, possibly leading to new ways of conceptualizing innovation in these industries, with consequent innovation in supporting institutions and policy frameworks (Hearn, Cunningham & Ordoñez, 2004; Potts et al., 2008).

2. Facilitating the linkages, spillovers, and externalities that are believed to be of strategic significance in the media cluster

Inducement of interactive linkages among innovation system players is the routine policy

solution to blocked innovation pathways. Innovation policies thus seek to correct "system failure," or absence of linkages and interdependencies which may arise from various combinations of market failure, government failure, and entrepreneurial failure (Woolthuis, Lankhuizen & Gilsing, 2005). Recent theorization of rationales for spatialized innovation policy emphasize the importance not just of R&D-based production of novelty, but also of broader acceleration of learning and options creation ("variety") through systemic improvement and reduction of information costs, promotion of trust-based cooperation, provision of services, and development of capacity for collective action (Laranja, Uyarra & Flanagan, 2008).

Among the most eagerly anticipated set of linkages in the Toronto media cluster is that between the film and television production firms and the interactive digital media sector or the larger Toronto-based IT industry. This linkage, it is widely believed, will allow the considerable content production capabilities of the local film and television production industry to migrate to digital media platforms, leading to new growth opportunities for the film and television production firms which, as our survey indicates, are presently facing very low growth opportunities in conventional over-the-air and physical distribution channels. The Toronto Film Board, in its recent strategic plan for the Toronto-based film and television industry, strongly advocates a policy-led conversation between film and television production firms and interactive digital media firms (TFB, 2007). The Ontario Media Development Corporation (OMDC), the provincial agency with responsibility for the Ontario screen-based media cluster, offers programs to support the development of digital media projects by Ontario media firms, and broadcasters are increasingly requiring their content suppliers to deliver multi-platform content. But since the monetization of digital content remains problematic in the film and television industry, to exploit their new digital content creation capabilities these production firms may have to learn to operate outside of their familiar world of film, broadcast television, PR, and advertising, and enter the world of entertainment software, e-learning, music videos, and the like. Interactive digital media clusters thus may become hybridized with a predominant local customer industry. In San Francisco the interactive media industry developed close links with the IT industry; in Los Angeles, with the film industry; and in New York, with the finance

industry (Indegaard, 2004). Britton (2007) traces the origins of the Toronto interactive digital media industry to five sources: providers of producer services to Toronto-based head offices of the advertising industry; the Toronto-base film industry; the local IT and computer industry; the infusion of broadband internet services; and the local availability of computer graphics training programs.

Although at a high level of aggregation creative industries or even media industries may appear to be a homogenous category, and digital media may seem to be the general-purpose technology of the creative industries, on the ground the opportunity landscape is undoubtedly rugged. Business linkages rather than technological linkages might be more useful for firms that are learning about new customers and new industries. This is an example of a systemic bottleneck or a potential path-creation opportunity that innovation policy rationales may accurately apprehend but for which they do not possess policy instruments fine enough to permit quick and accurate intervention. An analogous bottleneck is seen in the absence of flows of the abundant venture capital in Toronto into the media industry. As our survey results indicated, financing is scarce in the film and television production industry. Venture investors understand IT and public offerings; they do not have a business model that will work with highly risky project-based content innovation.

Innovation policy needs to identify and leverage the positive externalities within clusters. These externalities are conventionally conceptualized as localization economies or Marshall-Arrow-Romer (MAR) externalities, which are related to regional specialization, and urbanization economies or Jacobs externalities, which are related to innovation-inducing variety and diversity in the urban environment. While localization economies are in principle available to any sectoral concentration of firms, urbanization economies are only available to firms in diversified urban environments where firms may encounter diversity of industry, institutions and infrastructure, and labor. Cultural product innovation responds to localization and urbanization economies in different ways. Localization economies provide specialized labor and specialized support institutions. Urbanization economies stimulate product innovation in

creative industries when they facilitate movement of specialized labor among sectors (from live theater to television, for example), or aesthetic spillovers from one industry to another (from film to tourism, for example), or movement of factors from one sector to another (risk capital from the IT industry to digital media, for example). According to Lorenzen and Frederiksen (2008: 165), the likelihood and extent of new combinations increase with the centrality of the city: "variety necessitates clustering, novelty necessitates urban clustering, and radical [cultural product] innovation demands clustering in global and world cities."

3. factoring in the screen-based media cluster's numerous trans-local external linkages

In Ontario, policy for the screen-based media industries generally has addressed the question of external linkages in terms of inbound and outbound trade, including promotion of foreign location shooting in the province, and federal policy has contributed by arranging the signature of film and television co-production treaties with several dozen countries, providing opportunities for indigenous production firms to expand their access to financing and markets. However, as our survey shows, the Ontario screen-based industry is very oriented toward the local and regional market. Exports represent only about 30% of the Ontario cluster's earnings. The question for media innovation policy is how to encourage stronger export performance of indigenous screen-based media firms.

Media clusters are linked together through the top tier of media conglomerates and their supply chains, regional affiliates and allies, and distribution systems. Only a few studies have sought to map relationships among the principal media clusters. Krätke (2003) and Krätke and Taylor (2004) describe a global inter-urban media network that is constituted through linkages among the top thirty-three media firms and their suppliers and affiliates. The seven global media "alpha cities" are Los Angeles, New York, London, Paris, Amsterdam, Munich, and Berlin. The principal groups of "articulator cities" or nodes in this network are Los Angeles-New York, Munich-Berlin, London, Paris, Stockhom-Oslo-Copenhagen, and Rome. It is notable that Europe has many more primary, secondary, and tertiary media cities than North America, suggesting

the importance of national media regulatory regimes and national language markets in the development of media clusters.

Film and television production and distribution are part of the portfolios of the major transnational media conglomerates and the second-tier regional media conglomerates. The remainder of the portfolios of these firms typically consists of telecommunications, publishing, information, over-the-air or specialty broadcasting, Internet, entertainment, and other properties. Typically the headquarters of these firms, with the creative, executive, and financial decision-making functions, are located in one of a small number of major urban regions. Distribution activities are located in various geographic markets. Content suppliers and production activities are also located in major urban regions, but are decreasingly co-located with headquarters. This is the predominant but not exclusive configuration of media value chains in film, television, and video games.

Hollywood is undoubtedly the central cluster of the film and television in the English-speaking world. Initially, Hollywood studios were vertically integrated production chains encompassing practically all production inputs, from in-house salaried stars to theatrical exhibition venues. By the early 1950s, the Paramount anti-trust decision and the advent of television brought about vertical disintegration of the film industry, leading to the emergence of a number of independent production houses on the one hand, and an independent exhibition industry on the other. This was the process that sparked scholarly interest in Hollywood as a paradigmatic case of flexible specialization. However, by the late 1980s most of the Hollywood studios had been absorbed into larger conglomerates, and deregulation of telecommunications and media industries allowed an increasing degree of vertical re-integration. Hollywood remains the pre-eminent centre of the film and television industry but it is now embedded in multiple virtual linkages with financial centres, outsourced production complexes, broadcast and other distribution systems, and theatrical exhibition systems (Schatz, 2008). In English-speaking Canada's indigenous screen-based media industry, it is impossible to ignore the presence of

Hollywood, just as it is impossible to ignore the existence of the very large, culturally and geographically proximate media market in the United States.

Satellite film and television production complexes have emerged over the past decade in a variety of cities in North America, Australasia, Eastern Europe, and elsewhere as a result of production outsourcing, most of which originates in Hollywood. A small portion of foreign location shooting takes place for creative reasons, but most outsourced production is motivated by cost considerations, which are affected by labour costs, labour flexibility considerations, local availability of infrastructure, and increasingly generous tax incentives (Goldsmith and O'Regan, 2006; Lukinbeal, 2004; Scott and Pope, 2007). The Vancouver media cluster, and to a lesser extent the Toronto and Montreal clusters, are significant suppliers of outsourced production services to Hollywood. Engagement in service production may bring certain benefits to the host community, but the extent of its positive spillovers into the indigenous film and television production industry has been overestimated (Davis and Kaye, 2009; Vang and Chaminade, 2008).

Image capture and exhibition in the film industry are the only remaining major segments in the screen-based media value chain that have not yet been digitized, and this situation is already changing rapidly. The non-physical production characteristics of digital media make it very easy to organize production tasks in virtual networks. Production oversight, editing, special effects, and postproduction can all easily be done in different locations. It is inevitable that virtual production networks will expand greatly in the screen-based media industry. For media clusters, this puts a premium on excellent and affordable digital infrastructure as well as on excellence among media workers and small firms. It also plays into the trend toward co-productions among countries with small or peripheral media markets.

4. innovation policy measures for labor and small firms in creative industries

Maturation of screen-based media industries brings a polarized industrial organization in which a few very large firms co-exist with a small group of intermediate firms and large numbers of very small firms and freelancers. Screen-based media production firms typically service a small number of globally integrated central studios or national broadcasters. This pattern has emerged even in small national markets that have not been penetrated by foreign transnational media conglomerates – for example, the Korean online video game industry (Hassink, 2007).

Project-based production is the typical form of production in the film and television industries. It is also prevalent in interactive media, except in the case of animation studios and game publishers. Many researchers have been attracted to flexible specialization as an intriguing problem of organization and coordination of production (for example Ferriani, Corrado, and Boschetti, 2005; Mossig, 2004; Starkey, Barnatt, and Tempest, 2000; Sydow and Staber, 2002).

The flexible or even precarious working conditions in the screen-based media industry are well known. Salaried work is the exception to the rule; typically, work is organized on a freelance, project-by-project basis. Most research on media clusters recognizes the fluidity and insecurity of the media labour force, and a considerable research literature investigates the careers and work experiences of media labour under precarious employment conditions. The availability of abundant lower-cost production talent in urban centres outside of Hollywood is an important consideration in production outsourcing decisions by Hollywood studios (Christopherson, 2006; 2005). Labour precariousness has increased as the media labour market is flooded at the entry level by graduates from community college communication and media programs, and at the senior level by individuals who have been made redundant in waves of industry consolidation and privatization. However, a major difference between the older screen-based media industries (film and television) and the new interactive digital media is the persistence of collective bargaining arrangements in the older media industries in North America and Europe.

These arrangements support well-defined job roles and compensation scales. In interactive digital media, employment relations have diverged in Europe and North America: collective bargaining has been adopted in new media in the former region, showing the importance of national welfare policies and traditions, while in North America free agency and employment flexibility have prevailed, and on the job learning, fluid job roles, and piece work are widespread (Christopherson and van Jaarsfeld, 2005).

The particular work environment in the media industries introduces a new twist on labor issues into innovation policy, which tends to take for granted the scarcity of highly talented workers. Talent scarcity characterizes the labor market in technology-based clusters but not in screen-based media clusters except at the very top of the talent hierarchy. As noted earlier, the screen-based media industries are largely project-based and they rely on freelance workers, who come together in semi-permanent work groups or are hired temporarily or on contract by various employers. This labour pattern, summarized in a recent report by Gollmitzer and Murray (2008), offers flexibility for cultural content production companies and autonomy for the creative worker, but also brings a good deal of financial and social insecurity. Freelance production networks function as a reserve labour pool and absorber of risk (Christopherson, 2006; 2005). Wages are generally much lower than in science and technology clusters, and benefits are negligible, a fact that has become more pronounced with the ongoing erosion of the traditional business models in many of the creative clusters. Self-employed workers, for example, are not eligible for employment insurance. There is therefore a need to assess how labour policy can compensate for some of the shortcomings of the cultural labour market and help to socialize the risks that accompany the very high rates of innovation in the cultural industries.

Innovation policy for the screen-based media industries also needs to carefully consider the patterns of new firm formation and growth in these industries. Most branches of the media industries have a higher than average rate of new firm formation and exit (Hoag and Compaine, 2006; Hoag and Seo, 2005). However, little is known about patterns of new firm formation and

successful entrepreneurship in media clusters, although clearly the institutional antecedents of media entrepreneurs condition the success of the enterprise. Sixty percent of Canadian independent TV/film producers are microenterprises (i.e. firms with fewer than five employees, including firms without employees) that are often financially precarious and unprofitable (Nordicity, 2004; WIFT, 2004). Much more research is needed on the origins of successful media firms and on ways and means to support media entrepreneurship.

In Canada and in the U.K., policy measures such as domestic content requirements, program outsourcing requirements, and regional production incentives have supported large populations of independent television production firms. Bathelt (2004) identifies six sources of media firms in the Leipzig media cluster: "euphoric" local startups, local university spinoffs, unintentionally self-employed entrepreneurs, spinouts from state-directed firms, transplants from other parts of Germany that relocated to Leipzig in order to acquire contracts from a public media agency, and other branch establishments from elsewhere in Germany. Indegaard (2004) explores how the new media industry in New York's Silicon Alley was encouraged and promoted by the real estate industry, local economic development authorities, and the local venture capital industry in the years leading up to 2000. Individuals entered the New York interactive media industry from a broad range of industries: arts, corporate mass media, information technology, finance, and advertising. This range of prior experiences of founders undoubtedly had survival value for firms in the cluster. Davis, Vladica, and Berkowitz (2008) find that most of the members of senior management teams of eight successful small, independent production firms in the children's television segment in Toronto had prior high-level management experience in domestic or international media firms. Only in one case was an ultimately successful firm established by individuals directly upon graduation from university.

5) identifying cluster-specific implications of non cluster-specific policy measures

Policy environments for screen-based media industries are very complex and they were not

developed to address innovation policy or clustering issues. These environments overlap the functional policy domains of industry, trade, education, science and technology, labor, finance, and culture. Policies often vary by screen industry and by layer in the media system. Furthermore, most jurisdictional authority over screen-based media industries resides at the national, which in Canada is responsible for international trade, intellectual property legislation, and regulatory control of the broadcast and telecommunications industry. In Canada, provincial governments have jurisdiction over education and training. Governments at the metropolitan, provincial, and national levels may promote trade and investment, R&D, technical support, and strategic planning for media industries.

The implication for screen-based media clusters is that initiatives to improve jurisdictional advantage must encompass significant domains of government both horizontally and vertically. Multi-level jurisdiction over screen-based media clusters necessarily increases the operational and political complexity of any development initiatives. This degree of complexity is much greater in the case of screen-based media clusters than it is in the technology-based clusters we have investigated, posing an addition challenge to the development of effective innovation policy for a key creative industry.

Conclusions

The screen-based creative clusters reviewed for this paper demonstrate a number of clustering characteristics, some of which are in fact stronger than traditional technology clusters. Highly networked, geographically concentrated and generally focused on content and product innovation, these clusters are considerably larger than their technology counterparts and often more widely recognized. Yet at the same time, these clusters have several attributes specific to creative and cultural industries that underscore the fact that a narrowly conceived cluster approach cannot adequately address the various influences on cluster development. Indeed, creative clusters are much more deeply embedded in the social environment and political economy both at the local and national levels, than technology clusters. This exposes creative

cluster performance to influences from a much broader social and policy environment than innovation policymakers are accustomed to dealing with, and which we are only now beginning to understand.

References

Arthurs, David, Erin Cassidy, Charles H. Davis and David Wolfe (2009). "Indicators to Support Innovation Cluster Policy," International Journal of Technology Management 46(3/4): 263-279.

Bathelt, Harald (2004). "Toward a Multidimensional Conception of Clusters: The case of the Leipzig Media Industry, Germany," pp. 147-168 in D. Power and A. Scott (eds.), Cultural Industries and the Production of Culture. London: Routledge.

Benkler, Yochai (2006). The Wealth of Networks. New Haven: Yale University Press.

Benneworth, Paul, Mike Danson, Phil Raines, and Geoff Whittam (2003). "Confusing Clusters? Making Sense of the Cluster Approach in Theory and Practice," European Planning Studies 11(5): 511-520.

Britton, John (2007). "Path Dependence and Cluster Adaptation: a Case Study of Toronto's New Media Industry," International Journal of Entrepreneurship and Innovation Management 7(2-5): 272-297.

Christopherson, Susan (2006). "Behind the Scenes: How Transnational Firms are Constructing a New International Division of Labor in Media Work," Geoforum 37(5): 739–751.

Christopherson, Susan (2005). "Divide and Conquer: Regional Competition in a Concentrated Media Industry," pp. 21- 40 in G. Elmer and M. Gasher, eds., Contracting Out Hollywood: Run-away Productions and Foreign Location Shooting. Oxford: Rowman and Littlefield.

Christopherson, Susan, and Danielle van Jaarsveld (2005). "New Media After the Dot.com Bust. The Persistent Influence of Political Institutions on Work in Cultural Industries," International Journal of Cultural Policy 11(1): 77-93.

Davis Charles H. (2008). Screen-based Media Industry Clusters: Dimensions of Performance and Competitiveness. Report prepared for the Ontario Ministry of Culture.

Davis, Charles H., and Janice Kaye (2009). "International Production Outsourcing and the Development of Indigenous Film and Television Capabilities – the Case of Canada," in G. Elmer et al., eds., Locating Migrating Media. Lanham: Rowman and Littlefield, in press.

Davis, Charles H., Florin Vladica, and Irene Berkowitz (2008). "Business Capabilities of Small Entrepreneurial Media Firms: Independent Production of Children's Television in Canada," Journal of Media Business Studies 5(1): 9-40.

Ferriani, Simone, Raffaele Corrado, and Carlo Boschetti, 2005b. "Organizational Learning Under Organizational Impermanence: Collaborative Ties in Film Project Firms," Journal of Management and Governance 9: 257-285.

Gollmitzer, Mirjam, and Catherine Murray (2008). From Economy to Ecology: A Policy Framework for Creative Labour. Vancouver: Centre of Expertise on Culture and Communities, Simon Fraser University.

Goldsmith, Ben, and Tom O'Regan (2005). The Film Studio. Film Production in the Global Economy. Lanham, Md.: Rowman and Littlefield.

Hassink, Robert (2007). "Path Creation in City Regional Economies: the Case of the Computer and Video Game Industry in Seoul," unpublished paper presented at a workshop at Cambridge University, September.

Hoag, Anne, and Ben Compaine, 2006. "Media Entrepreneurship in the Era of Big Media: Prospects for New Entrants," unpublished paper, University of Pennsylvania.

Hoag, Anne, and Sangho Seo, 2005. "Media Entrepreneurship: Definition, Theory, and Context," paper presented at the NCTA Academic Seminar, San Francisco, April.

Hearn, Greg, Stuart Cunningham and Diego Ordoñez (2004). "Commercialisation of Knowledge in Universities: the Case of the Creative Industries," Prometheus 22(2): 189-200.

Indergaard, Michael (2004). Silicon Alley: the Rise and Fall of a New Media District. New York: Routledge.

Krätke, Stefan, and Peter J. Taylor (2004). "A World Geography of Global Media Cities," European Planning Studies 12(4): 459-477.

Krätke, Stefan (2003). "Global Media Cities in a World-wide Urban Network," European Planning Studies 11(6): 605-628.

Laranja, Manuel, Elvira Uyarra, and Kieron Flanagan (2008). "Policies for Science, Technology and Innovation: Translating Rationales into Regional Policies in a Multi-level Setting," Research Policy 37: 823-835.

Lorenzen, Mark, and Lars Frederiksen (2008). "Why do Cultural Industries Cluster? Localization, Urbanization, Products, and Projects," pp. 155-182 in P. Cooke and L. Lazzeretti (eds.), Creative Cities, Cultural Clusters and Local Economic Development. Cheltenham: Edward Elgar.

Lukinbeal, Chris (2004). "The Rise of Regional Film Production Centers in North America, 1984-1997," GeoJournal 59: 307- 321.

Martin, Ron, and Peter Sunley (2003). "Deconstructing Clusters: Chaotic Concept or Policy

Panacea?" Journal of Economic Geography 3(1): 5-35.

Mossig, Ivo (2004). "The Networks Producing Television Programmes in the Cologne Media Cluster: New Firm Foundation, Flexible Specialization and Efficient Decision- making Structures," European Planning Studies 12(2):155- 171.

Nordicity, 2004. Profile of Small and Medium-Sized Enterprises in the Cultural Industries. Toronto: report prepared for the Department of Canadian Heritage, March.

OECD (2008). Competitive Regional Clusters. National Policy Approaches. Paris: Organisation for Economic Co-operation and Development.

OECD (2002). Dynamising National Systems of Innovation. Paris: Organisation for Economic Co-operation and Development.

OECD (1999). Boosting Innovation: the Cluster Approach. Paris: Organisation for Economic Co-operation and Development.

Palazuelos, Manuel (2005). "Clusters: Myth or Realistic Ambition for Policy-Makers?" Local Economy 20(2): 131-140.

Picard, Robert G. (2009). Media Clusters: Local Agglomerations in an Industry Developing Networked Virtual Clusters. Jönköping, Sweden: Jönköping International Business School Working Paper Series No. 2008-3.

Potts, Jason, and Stuart Cunningham (2008). "Four Models of the Creative Industries," International Journal of Cultural Policy 14(3): 233-247.

Potts, Jason, Stuart Cunningham, John Hartley, and Paul Ormerod (2008). "Social Network

Markets: a New Definition of the Creative Industries," Journal of Cultural Economics 32: 167-185.

Schatz, Tom (2008). "The Studio System and Conglomerate Hollywood," chapter 1 in P. McDonald and J. Wasko, eds., The Contemporary Hollywood Film Industry. Oxford: Blackwell Publishing.

Scott, Allen J., and Naomi E. Pope (2007). "Hollywood, Vancouver and the World: Employment Relocation and the Emergence of Satellite Production Centers in the Motion Picture Industry," Environment and Planning A 39: 1364- 1381.

Starkey, Ken, Christopher Barnatt, and Sue Tempest (2000). "Beyond Networks and Hierarchies: Latent Organizations in the U.K. Television Industry," Organization Science 11(3): 299-305

Sydow, Jörg, and Udo Staber (2002). "The Institutional Embeddedness of Project Networks: the Case of Content Production in German Television," Regional Studies 36(3): 215-227.

Toronto Film Board (2007). Bounce Back to Fast Forward. Strategic Plan for Toronto's Screen-based Industry. Toronto : Toronto Film Board.

Vang, Jan, and Cristina Chaminade (2007). "Cultural Clusters, Global-Local Linkages and Spillovers: Theoretical and Empirical Insights from an Exploratory Study of Toronto's Film Cluster," Industry and Innovation 14(4): 401-420.

Vinodrai, Tara, Meric S. Gertler, and Ray Lambert (2007). "Capturing Design: Lessons from the United Kingdom and Canada," pp. 65-86 in Science, Technology and Innovation Indicators in a Changing World. Paris: Organisation for Economic Co-operation and Development.

WIFT, 2004. Frame Work: Employment in Canadian Screen-Based Media - A National Profile. Toronto: Report commissioned by Women in Film and Television.

Woolthuis, Rosalind Klein, Maureen Lankhuizen, and Victor Gilsing (2005). “A System Failure Framework for Innovation Policy Design,” Technovation 25: 609-619.

Table 1: subconstruct scores for the Ontario interactive digital media and film-tv production and post-production cluster

	construct	**subconstruct**	**IDM**	**film-tv**
current conditions	**factors**	human resources	3.88	3.79
		infrastructure	3.73	3.78
		business climate	3.07	2.81
	supporting institutions	government support	3.52	3.49
		community support	2.97	3.00
		suppliers	3.23	3.38
	competitive environment	local activity	3.06	3.21
		firm capabilities	3.92	3.77
current performance	**significance**	critical mass	3.62	3.40
		responsibility	3.52	3.52
		reach	2.92	2.38
	interaction	identity	3.39	4.24
		linkages	3.49	2.10
	dynamism	innovation	4.04	3.53
		growth	3.89	1.89