

‘Stars’ and the connectivity of cultural industry world cities: an empirical social network analysis of human capital mobility and its implications for economic development

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Abstract. Many scholars have studied the role of human capital and its social networks in order to understand uneven economic development. The cultural industries have become a focal point in this line of inquiry. In this paper we study the linkages across cultural industry hubs, with particular focus on the role of ‘star’ human capital networks in the establishment of connectivity and dominance by a few particular cities. To date, no one has used a technique that directly connects individuals across space and empirically follows the social networks of human capital across major economic hubs. We use a unique dataset, Getty Images photographs, and undertake social network analysis to study the social networks and human capital movement within the cultural industries. We collected caption information on over 600 000 photographs, 6754 individuals, 12 777 industry social events, and 187 locations. We analyzed these photographic data to determine whether empirical social connections could tell us something meaningful about cultural industry human capital mobility and its impact on the places in which it locates. Our results empirically reaffirm preexisting knowledge of cultural hubs, but we go farther by articulating the connectivity between these places and identifying the social relations and human capital that appear to correlate with their competitive advantage.

Keywords: cultural industries, world cities, global cities, economic development, social networks, human capital

Introduction

Many scholars have studied the role of human capital and its social networks in order to understand uneven economic development (see, for example, Granovetter, 2005; Lucas, 1988; Storper and Venables, 2004). In the extant literature it is well established that certain cities and regions possessing highly skilled human capital and its agglomeration effects become the central places where elite, international labor pools flock in order to advance their careers (Castells, 1996; Friedmann, 1986; Power and Scott, 2004; Sassen, 1991; Storper, 1997; Storper and Venables, 2004). This line of research has become increasingly important in the study of cultural industries which exhibit disproportionate concentration in a select number of cities that possess almost lock-in dominance in the cultural economy, such as Los Angeles, Paris, New York, and London (Currid, 2007; Rantisi, 2004; Scott, 2000; 2005).

Within cultural industries this necessity for agglomeration economies is particularly apparent due to the taste-driven nature of innovation and production. Spatial concentration is essential in order for particular gatekeepers to validate cultural producers’ work and for

these workers to subjectively engage those who will help mobilize their careers (Crane, 1972; Currid, 2007). Part of this agglomeration within particular cities can also be explained by the extremely project-based nature of cultural industries, which rely on spontaneous ad hoc networks of talent and capital and the gatekeepers and 'certifiers' who evaluate the final product (Becker, 1982; Caves, 2000; Faulkner and Anderson, 1987; Rossman et al, 2010; Scott, 2005); thus the labor market must be able to combine and recombine with relative ease (Caves, 2000; Elberse, 2007). These dynamics are often spatially bound into what Grabher (2002) has termed 'project ecology', establishing 'conventions' by which cultural products are deemed 'good' or 'bad' (Becker, 1982).

Where cultural gatekeepers set up shop is where cultural producers must show their stuff, thus spatially embedding many industry practices and norms (Gertler, 2003). These hyperagglomerations become what we call 'star markets'. Through their agglomeration of the top tier of labor-market talent, resources, industry gatekeepers, and the accompanying social milieu, star markets become the only obvious location choices for the 'star labor pool' at the top of the industry hierarchy. As Power and Scott (2004) remark, "Successful cultural-products agglomerations ... are irresistible to talented individuals who flock in from every distant corner in pursuit of professional fulfillment" (page 7).

The advantage of star markets beyond external economies and branding lies in the strong link between the cultural industries, mediatized events, and 'mechanisms of fascination' (Thrift, 2008), whereby the human capital within these industries become central foci in the production of culture and its accompanying glamour (Currid-Halkett and Scott, 2011). There is a well-established literature on the importance of human capital to economic development and the performative role that human capital and its social relations and institutions play in creating competitive advantage (Thrift, 1996; 2000). However, these 'networks of stars' and connectivity across hubs have been relatively unexamined in the study of world-city networks (Smith, 2003)—especially with regard to the cultural industries (Mould, 2009). In this paper we study the linkages across cultural industry hubs with particular focus on the role of star human capital networks in the establishment of connectivity and dominance by a few particular cities. While key international cultural agglomerations have already been established in the literature, we quantify their connectivity by identifying the cohorts of cultural human capital that move en masse between these agglomerations, thus establishing the world-city network of cultural industries.

We use a unique dataset—Getty Images photographs—and undertake social network analysis (SNA) to study the role of human capital and media in the establishment of these cultural monopolies and the connectivity amongst these hubs. We culled caption information from the Getty Images archive for a one-year period (March 2006 to February 2007), collecting data for over 600 000 photographs. We catalogued information on those in the photographs, where the photographs were taken, and at what types of industry events. Through the use of social network analysis, we follow the flow of cultural industry human capital across a network of 187 major cities. We studied 6754 individuals and 12 777 industry social milieus and events to document the movement of cultural industry human capital through major cultural hubs. These photographic data were analyzed to study empirical social connections and their relationship to human capital mobility and impact on the places in which they occur. To date, no one has used a technique that so directly connects individuals across space and empirically followed the social networks of human capital across major economic hubs.

In this paper we undertake a two-step analysis—identifying key cultural hubs and the flow of human capital within the cultural industries—with the hope that our work may shed light on the mechanism and variables that reinforce and perpetuate uneven development in the cultural industries. The main methodological approach uses Getty Images photographs

as a proxy for presence of social relations and talent concentration in the cultural industries. We use this database of photographs to identify key cultural industry geographic hubs and human capital. We employ SNA, a tool not conventionally employed in economic geography, to document a network of connectivity between places, events, and labor markets as a central mechanism for economic mobility, uneven development, and understanding of the world-city phenomenon. We construct a ‘co-attendance network’, through which we document the flow of talent from city to city and the links between individuals’ attendance in one locale and their presence in another city. We identify the dominance of a few key world cultural hubs where the business within these industries occurs. We call these cities ‘star markets’ and establish a relationship among high concentrations of star labor pools, social relationships among them, and the social institutions within the cultural industries. We argue that these hubs are essential stopovers for those interested in being successful within the cultural industries and note that many of the cultural industries tend to colocate their institutional milieus in the same locales. We speculate that this is due to the various already documented geographical externalities and knowledge spillovers and reputation effects associated with agglomeration and clustering (see, for example, Currid, 2007; Scott, 1993; 2005; Storper and Venables, 2004). Our results suggest that this transnational movement of ‘stars’ further reaffirms the positions of particular cities in the global hierarchy. While the usual suspects—New York, Los Angeles, and London—are disproportionately at the top of the hierarchy and are the most connected, we also find that there are strong niche markets that cater to specialized talent pools through the social milieu they cultivate: the Cannes Film Festival, Paris Fashion Week, and Utah’s Sundance Film Festival. Our results reaffirm preexisting knowledge of places with stocks of cultural capital, but we go further by articulating the connectivity between these cultural hubs and the social relations and human capital that help drive their competitive advantage. The analysis also articulates their linkages to smaller niche markets that depend on cultural specialization as a part of their place branding. Our work empirically identifies the connectivity between cultural hubs through the movement of human capital. While such linkages have been anecdotally assumed, our analysis offers robust affirmation of how world cultural hubs are connected to one another.

In the second part of our analysis we use the case of the film industry to look at individual mobility patterns of star talent. We track top film actors’ and actresses’ travel patterns around the world over a one-year time period. Two measures of success are employed to isolate the top film stars: industry prestige and media volume. As a proxy for these measures we use Forbes Star Currency, an industry ranking of actors and actresses by top Hollywood executives, and aggregate Google media and news volume, respectively. We analyze how individual and aggregate mobility patterns are correlated with individual success within the film industry. Our quantitative analysis is corroborated by interviews with key informants from the cultural industries; in particular, our interviews are drawn from those who work in entertainment and cultural media. Their responses help explain the importance of the events and social institutions to the stars’ careers and further corroborate our findings on the linkages across the city network and the role of place in star career trajectories within the cultural industries.

This paper is divided into four parts. First, the preexisting literature on world cities, human capital, and uneven development is considered. We then discuss the economic geography of the cultural industries. In the next two parts we discuss our methods and results. Finally, we conclude with a discussion of potential implications for the cultural industries, cultural star markets, and niche markets, and the importance of human capital flows in the cultural industries.

Theories and concepts

World cities and uneven development

The world-city network is a useful means by which to understand certain aspects of uneven development. While the processes of uneven development occur locally, global cities (Sassen, 1991; 2000) engage other dominant centers across a world-city network which enables flows of information, resources, and talent to move efficiently through an elite hierarchy of cities and regions (Castells, 1996; Friedmann, 1986; Taylor and Lang, 2005), creating 'glocalized networks' (Wellman, 2002) or what Henderson et al (2002) have called a 'global production network'. Although initially world-city studies focused on a 'hierarchy' of metropolitan areas and the stock of attributes within a metropolitan area (Friedman, 1986; Sassen, 1991), increasingly research on world cities has considered the connectivity between different places (Beaverstock et al, 1999; Doel and Hubbard, 2002; Knox, 1998; Smith, 2003). Key local hubs of industrial activity tend to strategically engage other hubs across the world. The world-city hypothesis demonstrates that industrial centers are more linked to each other across a network of talent, information, and capital than they are to locales closer in proximity (Beaverstock et al, 1999; Knox, 1998; Knox and Taylor, 1995; Taylor, 2004). These world-city networks are simultaneously local and global: local networks of talent and institutions produce tacit knowledge which is geographically bounded (eg 'you have to be there') (Gertler, 2003), while much of the innovation and decision making in these local places are distributed globally. The world-city hypothesis has generally been applied to finance and high-level producer services, but such network effects and connectivity between human capital, knowledge, and the formal and informal milieus they form are acutely present within the cultural industries as well. Runaway production may occur in Vancouver, but the stuff of running the film business and the powers that be still remain in Hollywood (Christopherson and Storper, 1986; Scott, 2005), and the circuit of film awards, premiers, and other important industry institutions still follows a well-worn trail through just a few key cultural capitals: Los Angeles, New York, and London. These dynamics are performative and self-fulfilling, thus further reinforcing themselves over time due to cumulative reputational effects.

Economic development and the role of human capital

Human capital has long been considered an influential variable in economic development (Lucas, 1988; Mathur, 1999). Concentrations of highly skilled individuals produce knowledge externalities and increasing returns because information is mutable, reusable, and interpreted in multiple ways (Romer, 1986; 1990), but also because particular places become hubs for transnational networks thus capturing the innovation processes within particular industries (Beaverstock, 2004; Coe and Bunnell, 2003; Saxenian, 1994; Vertovec, 2002). Certain places become enticing to talented human capital. Simultaneously, these places are also shaped and formed through the human capital and ensuing social interaction within their boundaries (Pratt, 2000). These dynamics reinforce the desire of other talented human capital to collocate, producing human capital externalities (Moretti, 2004)—or, as Martin (2000) explains:

“The form and evolution of the economic landscape cannot be fully understood without giving due attention to the various social institutions on which economic activity depends and through which it is shaped” (page 77).

Coe and Bunnell (2003) argue that the study of 'knowledgeable individuals' (rather than firms) and their social networks explain the innovation systems across and within regions. As Lucas (1988) famously remarked, “What can people be paying Manhattan or downtown Chicago rents *for*, if not for being near other people?” (page 39, original emphasis).

While Glaeser and Saiz (2003) and Florida (2002) have looked at high human capital more generally, other scholars have isolated industry stars in particular and the impact of where they locate and the collaborations they form. Elberse (2007) found that, while individual film

stars are not positively impactful on a movie's box-office receipts, networks of top actors working together on a movie generate substantial increased revenue. Similarly, Rossman et al (2010) analyzed the success rate of top stars' collaborative work. They found that those who worked together on films increased their chances for Oscar nominations and status within the industry. Zucker et al (1998) report robust results indicating that the 'geographic distribution of stars' within biotechnology determined the emergence of biotechnology-firm establishments and breakthrough innovations. They empirically trace the star-scientist-development link to the tacit knowledge and localized spillovers that are attained through collocation of human capital and resources. Currid (2007) found that young artists tended to move to New York City en masse in order to circumvent the traditionally long vetting processes and to attain high status within the art world by engaging gatekeepers (eg, editors, dealers) who were all collocated within the city. McNeill (2005) has documented the 'star global architect' as an impactful branding mechanism for urban development projects.

Cultural industry agglomerations

While cultural hubs have been identified partially by their stocks of star human capital, the linkages between these cities' cultural industries have not been well documented despite the extensive transatlantic and bicoastal exchange of capital, social institutions, labor markets, and ideas among these cities, whether through Fashion Week, art fairs, the Oscars, or film premiers. More simply, most studies of cultural industries are autonomous case studies of place-specific activities (see, for example, Currid, 2007; Lloyd, 2005). Although linkages across media capitals have been documented (Curtin, 2003; Kratke, 2003), cultural industry world-city networks are largely considered a derivative of advanced producer services networks, rather than an important set of linkages and exchanges that further reinforce the movement of capital and collaboration among a key set of actors and institutions (Mould, 2008). Drawing from Thrift (1996; 2000) and Pratt (2000), in this paper we study the influence of humans and their social connections in the cultivation of uneven development in the cultural industries. We argue that social interaction is geographically bound to particular places and thus the benefits of these social exchanges disproportionately benefit the locales in which they occur. We use a large dataset and empirical quantitative analysis to identify a possible world-city network of the cultural industries by studying the geographic mobility of star human capital.

Data and methods

Data: Getty Images as proxy for the cultural industries

All industries have events, membership meetings, expert gatherings, and other social and economic assemblies where industry vanguards and aspiring young talent hobnob. Because of their dependence on the media for validation and generation of 'buzz', the cultural industries' milieu tends to be disproportionately visually documented (Boorstin, 1962; Currid and Williams, 2010; McNamara, 2009). The most prestigious events with the top industry talent tend to be photographed and documented the most by the media. More cynically, Boorstin (1962) remarked with regard to a particular type of cultural producer:

"Being known primarily for their well-knownness, celebrities intensify their celebrity images simply by becoming widely known for relations among themselves. By a kind of symbiosis, celebrities live off each other" (page 65).

The media recording of the cultural industries allows us to document the social and institutional gatherings that bring together the individuals who make up the cultural industries.

We used Getty Images photographic data of arts and entertainment events to track the movements of stars across the events, gatherings, and institutional milieus that they attended. Obviously, in the case of cultural industries, the term 'stars' has a commonplace definition,

but stars exist in all industries (see Zucker et al, 1998)—they can be thought of as the most talented and in-demand part of the labor pool. Getty Images is the most comprehensive photographic agency in the world: the archive of photographs documents events associated with politics, current affairs, sports, and arts and entertainment, and therefore produces ‘data’ that are highly useful for the line of inquiry we are following. Cultural industries are visual and depend on media coverage for their success, and photographs of cultural stars are a part of what Thrift (2008) would call the ‘technologies of public intimacy’, allowing viewers to get more access to and thus reaffirm the star position of particular cultural producers. Getty photographers attend and document with great frequency those events that are most important to the industry and media markets, and those events attended by the stars within the industry. We studied photographs that captured social events for the film, fashion, music, design, and art industries. These events included movie premiers, fashion runway shows, major charity galas, after parties, and award ceremonies (eg, Chanel’s fashion show in Paris, the Oscars, the Glastonbury Festival, New York City’s Metropolitan Museum of Art’s Costume Institute’s gala). Additionally, these photographs document the most highly skilled and economically rewarded talent pool in the cultural industries. The mechanism and agency through which Getty photographs people align with how ‘talent’ is rewarded in cultural industries: the stars of the cultural industries are invited to the most prestigious events and photographed with the greatest frequency. There is a strong relationship between those who are photographed a lot and their measure of importance (or talent) to their respective cultural industry or the media at large (Currid and Williams, 2010). As such, the labor pools documented in Getty Images are not ordinary ‘cultural intermediaries’ (Bourdieu, 1984; Zukin, 1989) but, instead, are those whom the industry has selected. These stars are different because they tend to be disproportionately rewarded, financially and otherwise: for example, they are starring in blockbuster films, major fashion advertising campaigns, and winning music and movie awards. Their contribution is economically measurable and much of their economic activity is distributed from dominant cultural hubs.

Methods: the use of empirical data to study cultural industry labor mobility

In this analysis we did not study the imaging industry or media industry: rather, we used data from Getty Images as proxies for the locations and events which stars attend. We undertook a few steps in order to transform the editorial website information (constructed for the use of journalists and editors) into structural data. We collected caption data for one year (March 2006 to February 2007) of all the photographs taken in arts and entertainment around the world. These photographs document major and minor events in fashion, film, music, design, and art, along with cataloging events that attract a lot of attendees from these industries (eg, charity balls, fundraising galas, press conferences, or birthday parties). Individuals in the photographs include actors, artists, producers, directors, musicians, fashion designers, fashion models, and other participants in the cultural industries. In the first stage, we collected and catalogued the data from the captions associated with the Getty photographs. To cull these data, we designed a program using the Perl programming language to collect all of the caption data from the Getty Images website’s arts and entertainment photographs for the specified one-year period. The Perl program (bot) allowed us to collect these data at a higher rate than we could do manually. We then employed Natural Language Processing (NLP) analysis to identify ‘person names’. Person names, places, and occupations, along with other structural data (eg, event date) were inserted into a relational database. We then spot-checked the data for accuracy. From this dataset, we built a two-mode network connecting people to events. A person is connected to an event if that individual is photographed at the event. SNA allowed us to analyze the connection beyond pairwise analysis and to take into consideration the impact of social relationships that extend beyond first-degree neighbors (ie, those who are

simply present in the same photograph). This methodological approach enabled us to study the influences of the entire network and the variables within it across different events and geographical locations.

Whereas much work on the cultural industries has been place specific, we believe that a more systematic gestalt method is necessary in order to understand cultural industry star markets and the relationships that form between and amongst them. To that end, our dataset yielded 616 248 photographs, 12 777 events in 187 locations, and 71 370 nodes (ie, individuals in the photographs). In order to reduce noise and to capture those who regularly participated in cultural industry events, we limited our analysis to those who were present in four or more photographs. This new criterion is a reasonable proxy for level of media interest in particular individuals, and an individual's regularity of participation within the cultural industries' milieu. Our preliminary tests showed that the cutoff reduced noise dramatically while keeping the key cultural players in the database. This new criterion decreased the number of studied individuals to 6754, a reduction of almost 65 000 in the number of nodes. The other outputs remained the same. Some individuals are in photographs alone, while others are in group photographs.

The global cultural network

From our data we identified the ten most photographed places in the world: New York City, New York (NY); Las Vegas, Nevada (NV); Australia (AUS); London, Great Britain (GBR); France (FRA); Florida (FL); Germany (DEU); Park City, Utah (UT); Los Angeles (LA), California (CA); and Japan (JPN). We created another variable other which is a composite of other photographed locales that did not generate a lot of photographs individually. Based on Getty's identification of places, which includes cities, states, and countries, together we were able to isolate some cities in this analysis by looking at the events associated with a particular state or country. In the case of California, New York, and Great Britain, almost all the events in our database occur in Los Angeles, New York City, and London, respectively. In other instances, there was a more eclectic group of locations. For example, many fewer photographs are taken in France and Japan than in the United States or the United Kingdom and, thus, in order to study the statistical importance of French cultural events it was necessary to aggregate all of the events to France as a whole, as was the case with Japan and Australia. Through social network analysis, we studied the co-attendance between locales (eg, how many people who attend events in Los Angeles also attend events in New York?).

Geographical patterns and industry success: a case study of the film industry

In the second part we added an additional layer of analysis by considering the geographical movements of 'talented stars' and 'media stars'. We were interested in whether there is a correlation between an individual's success with the cultural industries and his or her geographical movements or attendance at particular events. We used the film industry as our case study. To do this we isolated all photographs and events that had film stars in the photographs. We studied the relationship between a film star's industry ranking and her or his geographical travelling patterns, or where he or she spent time. In order to build a film industry success model, we used two criteria of success: talent, or 'industry prestige'; and media profile. For the talent proxy we used *Forbes Magazine* Star Currency index, a measurement of film-star bankability based on a survey conducted by the magazine with top Hollywood studio executives (surveyed executives, $n = 157$). This measure captures success as viewed by 'experts', as in those who are in top decision-making roles within Hollywood. Stars were given a score, from 0.0 to 10.0. Top-ranked stars included Will Smith (10.0), Johnny Depp (9.89), Leonardo DiCaprio (9.89), and Angelina Jolie (9.89).

Our second method of measuring success was through 'new-media mentions', or those stars 'known for their wellknownness' (Boorstin, 1962). This aspect of the analysis focused on

a different type of success than basic talent. Cultural industry stars attain fame and recognition and ensuing career opportunities in part because of their media and consumer appeal. Thus, individuals like Lindsay Lohan or the stars of *Jersey Shore* may not be talented in the conventional sense but are able to translate their media appeal into deals, interviews, and so forth (Currid-Halkett, 2010). New-media mentions were captured through collecting Google blog search results for the same time period as the studied caption information. Google does not subjectively rank media stars: rather, through the use of Perl programming, we were able to count the number of unique blog mentions of all individuals in our photographic database. Top media stars and their media volume include: Michael Jackson (952 568), Paris Hilton (77913), Madonna (81 507), Britney Spears (125 704), and Lindsey Lohan (62 513). In this part of our analysis, we studied only those individuals who were simultaneously present in Getty Images photographs, Forbes Star Currency rankings (a list of 1410 actors and actresses), and Google media. From these criteria, our film-stars database included 854 cases.

We used a linear multivariable regression to tease out the relationships between geographic travel patterns, media profile, and perceived talent. We constructed two models with the aforementioned selected identified places as explanatory, and Star Currency and Google media volume as dependent variables. Below are our regression equations:

$$\text{score} = 3.204 + 0.212\text{NYs} + 0.432\text{GBRs} - 0.099\text{GBRh} + 0.364\text{AUSs} + 0.415\text{DEUs} \\ - 0.272\text{NVh} + 1.696\text{JPNh} + 0.38\text{others}$$

$$\text{volume} = -1641 + 1165\text{CAs} + 189\text{CAs} + 1326\text{GBRs} + 3088\text{JPNs} + 4151\text{JPNh} \\ + 2528\text{AUSs} - 726\text{AUSh} + 2729\text{FLs} + 163\text{NYh} - 1808\text{NVh} + 1007\text{others}.$$

In addition to the explanatory variables discussed above, we added two more types of variables indicated by suffixes ‘h’ and ‘s’ associated with each identified locale we studied. We calculated the number of events photographed in each of these locations and the number of times people were photographed in any other place before they attended an event in one of the aforementioned places of interest. We can interpret the movement from one place to another as a theoretical ‘flight’ one needs to take to go from place A (eg, Florida) to place B (eg, Japan). This measure is connoted by the variable ‘s’ (eg, GBRs). This variable acts as a proxy to gauge the extent of mobility needed to attend cultural events around the world. We also created a variable that measures the total number of events an individual attended in one place within the same period of time. This variable is identified as the locale’s abbreviation and an ‘h’ suffix (eg, GBRh). We measured this variable by tracking an individual’s consecutive attendance in a location by date (eg, if Angelina Jolie is photographed in Los Angeles and a week later is photographed again in Los Angeles with no other photographed events in between these events, we hypothesize that she did not move around to other important industry events in other places during that time period). Although this measure does not capture other types of travel the individual may undertake, we are only interested in her travel movements connected with career-associated events. Each geographical location studied was examined with regard to ‘flights’ and consecutive attendance (eg, JPN: JPNh, JPNs; GBR: GBRh, GBRs). Additionally, we conducted interviews with key informants based in New York, London, and Los Angeles to illuminate our quantitative analysis. We spoke with individuals who work in media and publicity and whose job description includes evaluating, photographing, and reporting on stars in the cultural industries. We include these interview results as they relate to our SNA and regression findings.

Results

A map of the (cultural) world, according to Getty

We calculated the number of events photographed in each location around the world and mapped them (figure 1). Predominantly, photographs are taken in North America and the United Kingdom, specifically California, New York, Canada, and Great Britain. Photographs of events in other countries (eg, Brazil, Russia, China) are taken with much less frequency, as noted by the light-colored parts of the map. Parts of Africa and the Middle East have no Getty documentation of cultural events. This result may suggest a lack of Western media and consumer interest in the cultural events in these areas or that it would be too costly to travel to these markets. Getty is market driven: it takes photos of events that will have a market value in magazines, photo journalism, and print media. This statement is not to say that culture does not exist in these other areas, which is hardly the case. Future research may explain the absence of particular locales and the process by which places emerge as commodified cultural hubs.



Figure 1. The map of the (cultural) world according to Getty Images.

Identifying the star markets

Our social network analysis identified a small number of locales that play host to important events and social milieus within the cultural industries. Although California, New York, and Canada are the most photographed places overall, the most connected cities are New York City, Los Angeles, and London. These cities play host to 80% of all cultural industry gatherings as measured by the Getty database of arts and entertainment events (see figure 2).

Our results demonstrate that London, New York, and Los Angeles are the most connected cities: people present at cultural gatherings in one of these three cities are also likely to attend events in the other two. Los Angeles and New York City exhibit the most co-attendance of any two locales. The second and third strongest linkages are between Los Angeles and London, and New York and London, respectively. Our results indicate that the star human capital within these industries passes through these places for the identified important industry and institutional events. While this finding may initially appear unsurprising, the social network analysis empirically supports that the labor pool contributing to each specific cultural agglomeration is actually shared amongst them. Whereas the extant literature documents that these three cities have strong concentrations

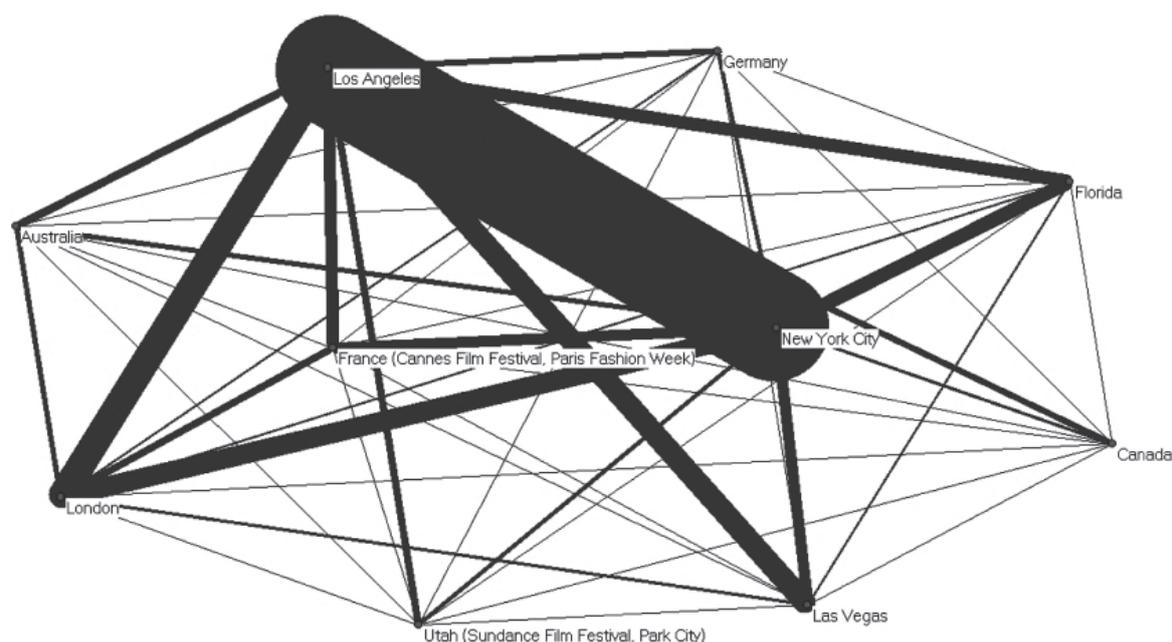


Figure 2. Co-attendance network within the cultural industries.

of highly skilled labor, our work documents the connectivity of this labor pool across space rather than just measuring the discrete stocks of human capital which each city possesses. These findings suggest that the connectivity between these cities may partially explain their status as world-renowned cultural hubs.

The analysis also demonstrates how Los Angeles, New York, and London are a cooperative oligopoly in star markets. Their most important cultural events and social relationships feed off each other, and also reduce the ability of other places to join the market. Our research highlights unique interindustry connections, such as those between the Oscars (film) and New York’s Fashion Week. The spatial link between Los Angeles and New York is fairly straightforward, as these two cities are the most prominent cultural centers in the United States and are obviously geographically connected. We speculate that the overwhelming connectivity between Los Angeles and London is a result of each city’s position as their country’s film capital and the flow of talent within the film industry between these culturally intertwined cities.

Conducting interviews with mediators within the cultural industries provides contextual explanations for our quantitative results. These key informants overwhelmingly indicated that the visually driven nature of cultural industries requires cultural industry stars to attend events in these three cities in order to attain global success. One well known UK publicist noted the quick linkages between London and America, because London “is the center of the media universe”. The publicist went on to remark that he felt it was quicker to transmit information about his star clients to America at large from London than if he were located in New York City. The owner of X17, a major LA-based photographic agency, explained:

“[X17 is] constructing a story every day. Everyone buys *People* magazine, everyone buys *US Weekly*. They have to be a part of this, in front of our lenses.”

The informant went on to explain that X17’s online site receives almost 400 000 unique visitors every day. Another journalist, who has worked for several major news outlets, remarked:

“If you’re not in the thirty-mile zone, then you’ve kind of opted out. LA, New York, London—that’s where you go to show the flag. For the life of me, I can see no other reason to go to Hyde [a Los Angeles-based nightclub].”⁽¹⁾

Respondents also explained the unique role of each city for those in the cultural industries. One high-profile publicist explained the distinction between different cultural hubs:

“In New York City, in the cold, dreary weather, you can’t wear those outfits. In Los Angeles, you can. So with all due respect to a picture of Martin Scorsese, in California, all the girls have suntans.”

While this comment might appear glib, the publicist was emphasizing a central point with regard to how image and reputation is place-specifically constructed. Similarly, another respondent from the film industry explained that, in order to be taken seriously in the film industry, one must have a Los Angeles telephone number. Having a San Francisco or Boston area code indicated, as he put it, that “that person’s not serious”. Or, as another film industry interviewee remarked:

“I moved here [Los Angeles] from New York. I learn more and more [because] I’ve seen friends leave Los Angeles for New York and I don’t hear from them for a long time and those who move from New York [to Los Angeles] who immediately do well ... it’s all about your contact, your networking, who you know. People like me tend to have breakfast lunch and drinks very frequently. It’s easier to be a face than a name or a voice on the phone.”

A respondent based in New York remarked:

“In terms of work, I can’t imagine being an actor living in Chicago.”

The respondent went on to explain that, as New York is also a media capital, film actors are able to manipulate the media and increase their profile through their publicists who encourage the media and paparazzi to show up to where the star is having lunch or attending events. The interviews suggest that each identified cultural hub has its own specificity of transactions and reputation which influences the location decisions of cultural producers. But the results also indicate that stars understand media’s role in allowing them to enhance their reputation. As one high-profile Hollywood publicist explained:

“There are people who are famous who are not in those media pockets [Los Angeles, New York, London], but it’s an aberration. You can’t emerge out of [a place] that’s not indigenous to the profession.”

The ‘Sundance effect’: niche star markets

Beyond cultural industry hubs London, New York City, and Los Angeles, we identified a second tier of cities that, due to their specialization, are importantly linked to the global cultural cities: Park City, Utah; Las Vegas, Nevada; Miami, Florida; Paris, France; and Cannes, France emerge as important niche cultural hubs (see figure 2). Park City, Utah is home to the annual Sundance Film Festival, a highly respected ten-day industry event that draws top film actors, directors, producers, and buyers in the industry. Established by the film actor and director Robert Redford, Sundance has become a marketplace where producers show their films in the hope of finding a distributor who will buy the rights. The event is also a huge social event, drawing actors, screenwriters, and other film-industry labor to the copious parties and film screenings. Our network analysis links Park City to Los Angeles through their

⁽¹⁾ The ‘thirty-mile zone’ is also known as the ‘studio zone’ and is demarcated by the thirty-mile radius extending from West Beverly Boulevard and North La Cienega Boulevard in Los Angeles. It is where most of the major film studios are located. This area is used to discern union benefits for workers in the entertainment industry. The thirty-mile zone is now a loose term for Hollywood and its acronym, TMZ, has been adapted by a major entertainment industry gossip website by the same name.

industry affiliation. Similarly, Paris and Cannes, France are linked to Los Angeles, London, and New York because of Parisian Fashion Week and the Cannes Film Festival.

A typology of stars and ‘geobehavior’

We were also interested in whether variations in individual stars’ mobility patterns might correlate with cultural industry status. The case of the film industry allows us to study the link between differences in star ‘geobehavior’ and the differences in their success and status within the industry. Our work cannot document every hour of each individual cultural producer’s life, but the data do track movements to important culture industry events. This tracking allows us to infer how film stars’ social behavior is associated with their career outcomes. The regression analysis showed that geographic behavior is correlated with type of star: media driven (Google new-media volume) versus industry-prestige driven (Star Currency ranking). This analysis indicates a typology of stars within the film industry that can be partially explained by geographical movement. We caution that at this point we are identifying associations, rather than causality. The strongest predictor of industry-prestige star status was attendance at events outside of Los Angeles. Coefficients on time spent in Los Angeles and extensive time spent in New York (NYh) were not different from zero at the 95% level of confidence. London, New York, and ‘others’ (a composite of all cities/countries not studied individually) had the greatest positive correlation with increased Star Currency (eg, industry prestige) with standardized coefficients of 0.184, 0.144, and 0.273, respectively. Spending time in Japan for consecutive events also had a positive influence on the model at the 95% confidence level (see table 1).

On the other hand, time spent in Las Vegas had a negative correlation with industry prestige, reducing Star Currency score by 0.272 (standardized coefficient -0.054) for each consecutive event an individual attended in the city. Industry-prestige stars do pass through Los Angeles and New York (as evidenced by the co-attendance analysis), but because these cities are a necessary passing-through point for everyone in the film industry, they do not signal a unique position vis-à-vis other actors and actresses. Further, because New York and Los Angeles dominate the US film events circuit, Las Vegas does not tend to be an important stopping-off point for talent in the film industry, thus decreasing its chances of hosting US film-related events. Additionally, Las Vegas is not a media center, and does not often host events that would draw mainstream media interest on a regular basis. Consequently, there is

Table 1. Statistical output: industry-prestige model.

Model 13	Unstandardized coefficients		Standardized coefficients β	t	Significance	95% confidence interval for B	
	B	standard error				lower bound	upper bound
(Constant)	3.204	0.086		37.306	0.000	3.035	3.372
NYs	0.212	0.047	0.144	4.544	0.000	0.121	0.304
GBRs	0.432	0.085	0.184	5.073	0.000	0.265	0.600
AUSs	0.364	0.147	0.076	2.475	0.014	0.075	0.653
DEUs	0.415	0.189	0.069	2.202	0.028	0.045	0.785
others	0.380	0.046	0.273	8.206	0.000	0.289	0.470
GBRh	-0.099	0.053	-0.066	-1.870	0.062	-0.203	0.005
NVh	-0.272	0.151	-0.054	-1.800	0.072	-0.569	0.025
JPNh	1.696	0.442	0.116	3.841	0.000	0.829	2.563

Note. Dependent variable: score.

an opportunity cost to stars spending time in Las Vegas instead of being in the camera's flash in Los Angeles or New York.

Media stars had some notably different geographical patterns from those with industry prestige. Travel to 'other' places, Florida (FLs), and to Los Angeles (CAs) were the most influential variable in the Google media volume model, with a standardized coefficient of 0.204, 0.197, and 0.264, respectively (see table 2).⁽²⁾ London remains important in the Google media volume model (standardized coefficient 0.154). Attending singular New York events (NYs) has no influence on the model, whereas attending consecutive events in the city (NYh) is associated with a slight increase in media mentions. Las Vegas remains a negative influence on media volume, and we speculate that this result owes to the explanations put forth above with regard to Star Currency. On the whole, some of the differences in the media and industry-prestige geobehaviors can be explained by the different natures of these stars' status. Industry stars tend to be acclaimed for film awards and talent achievement, and these accolades are acknowledged at major events around the world. As a result of their acclaim, top film stars often attain a global following which is why they tend to show up at events in far-flung locales. Media stars attain media following due to their ability to remain interesting to photographers and reporters, and thus they must remain in front of the cameras which are located in major media hubs like Los Angeles, London, and New York. The Florida influence is somewhat surprising, but many of the events held in the state (eg, Art Basel, Miami; Billboard Latin Music Awards; and Miami Beach Fashion Week) tend to attract media stars who are not necessarily affiliated with these industries.

Table 2. Statistical output: media volume.

Model 10	Unstandardized coefficients		Standardized coefficients β	t	Significance	95% confidence interval for B	
	B	standard error				lower bound	upper bound
(Constant)	-1640.742	314.699		-5.214	0.000	-2258.414	-1023.069
CAs	1165.268	156.942	0.264	7.425	0.000	857.231	1473.304
GBRs	1325.527	232.561	0.154	5.700	0.000	869.070	1781.983
JPNs	3088.103	1062.954	0.088	2.905	0.004	1001.801	5174.404
AUSs	2528.028	589.910	0.148	4.285	0.000	1370.189	3685.867
FLs	2728.745	383.522	0.204	7.115	0.000	1975.992	3481.498
others	1006.640	151.906	0.197	6.627	0.000	708.489	1304.792
CAh	188.907	60.050	0.100	3.146	0.002	71.044	306.769
NYh	162.994	69.316	0.063	2.351	0.019	26.944	299.044
NVh	-1807.803	504.344	-0.097	-3.584	0.000	-2797.700	-817.907
JPNh	4150.776	1659.199	0.076	2.502	0.013	894.201	7407.351
AUSh	-725.590	313.142	-0.079	-2.317	0.021	-1340.206	-110.974

Note. Dependent variable: volume.

Discussion: explanations, limitations, and implications

In our research we have attempted to understand uneven geographical development within the cultural industries arising not just from hub-specific stocks of human capital but also the global network of cultural labor pool mobility. The analysis suggests that there are a small

⁽²⁾ Average Star Currency score is 4.03, with a range from 0.87 to 10.00. Average Google volume was 3392.67, with a range between 10 and 62 513 media hits. Please see tables 1 and 2 for unstandardized coefficients.

number of major cultural hubs throughout the world and that these locales maintain their oligopoly through the flow of elite labor within the cultural industries that connects them to one another. We designate the small number of places that play host to a disproportionate amount of cultural activity as 'star markets', where the business and exchange of important information amongst key transnational industry players occurs at major industry events and social milieus.

The co-attendance network analysis reaffirms the global cities and world-city network hypothesis (Beaverstock, 2004; Friedmann, 1986; Glaeser and Saiz, 2003; Knox and Taylor, 1995; Sassen, 1991) and demonstrates that the patterns identified in this literature documenting flow of capital and people within the financial and high-level producer services sectors can also be applied to the cultural industries. While there are differences in the geography of the cultural industry global network, the network structure and attributes that explain the pattern (eg, capital, information, and institutional environments) are remarkably similar. The cultural industries may have runaway production in far-flung parts of the world, but their advanced economic functions remain in just a few key closely connected cities. This finding is similar to that of the core-periphery argument outlined in the world-city literature.

There are two specific and robust geobehavioral conclusions that emerge from our research. First, aggregate analysis of human capital in the cultural industries demonstrates that there are a small number of very connected global headquarters, with a few identified specialized star markets. While the extant research has documented the individual cultural agglomerations these cities possess, our research contributes by empirically identifying the linkages and connectivity between these cities through their shared elite human capital or 'stars'. This connectivity may, in fact, reinforce their hub positions. Second, the individual analysis indicates that industry-prestige stars tend to reach outside these star markets whereas media stars tend to maintain their coverage by remaining within the star markets. The reason for this outcome seems fairly straightforward. Media stars depend on the media (Boorstin, 1962) and thus tend to locate in media hubs with greater frequency. Photographers, after all, have to take pictures of somebody, so savvy media stars make themselves convenient. Conversely, attending events off the beaten track does not necessarily increase industry prestige but, rather, attendance at these unconventional locations is a signal (rather than a cause) of a star's success within the industry (ie, they are invited to Japan because they are stars, not the other way round). Thus these results suggest a certain degree of endogeneity to the link between industry prestige and presence in unconventional hubs. Future time-series analysis may tease out any causal relationships.

Counterfactual: the case of Bollywood

Recent pioneering work on Bollywood has identified this Indian film capital as a global juggernaut in terms of production, revenue, and global reach (Desai, 2004; Lorenzen and Taube, 2008). Despite the global reach of Bollywood, particularly amongst the Indian diaspora in the United States and the United Kingdom, the Indian film industry does not show up in the Getty Images database. Just one Bollywood star shows up in five photographs, and the photographs are documenting his court trial rather than a film event. Shahrukh Khan, Bollywood's most celebrated film actor, and arguably one of the most famous film stars in the world measured by sheer quantity of fans, does not appear in any of the photographs.

The ethnographic work done by Lorenzen and Taube (2008) may explain these results. Their research describes Bollywood as an insular film cluster: Indian studios and film stars do not engage with other film capitals, Western studios, or other cultural milieu around the world. Bollywood distributes its films throughout the world for its diaspora, but it has not sought to attain connections with Hollywood—despite the latter's attempts to do so (Lorenzen and Taube, 2008). As Lorenzen explains,

“For those who haven’t made it to the highest level [of the Bollywood film industry], it would be a real opportunity cost to disappear to Hollywood” (personal interview with Lorenzen 2009).

Similarly, although our dataset includes photographs taken in 187 locations, it is missing important parts of the world, namely parts of Africa, India (including Mumbai, Bollywood’s film capital), and China. How a place becomes a commodified cultural hub (as documented by Getty) remains an important future research question.

The ‘Sundance effect’: implications for development in niche markets

Another locale will not usurp London, New York, or Los Angeles’ oligopoly positions in the near future. Less trouble is simply less trouble: a film star is unlikely to attend an awards ceremony in Ohio when the one in Los Angeles attracts more stars, more directors to schmooze, more media, and more prestige. That said, our identification of niche star markets demonstrates that particular cities can capture a specialization within the cultural industries and capitalize upon it through establishment of events that draw stars and industry gatekeepers. Increasingly, the role of cultural production and arts districts has become a focal point in the development and planning literature (see Currid, 2007; Florida, 2002; Lloyd, 2005; Stern and Seifert, 2010): Cannes Film Festival; the Guggenheim in Bilbao, Spain; the Sundance Film Festival in Park City, Utah; and Art Basel, Miami are a few examples of such successful ventures. There is ample evidence that places have incorporated cultural festivals as part of their development strategy (Austin’s South by Southwest, Glastonbury Festival in Southwest England, and so forth). Media hubs are not as mobile as star labor pools, which may explain why some places (eg, New York, London) perennially remain so impactful within the cultural industries, which are heavily dependent on media attention and visual documentation (Boorstin, 1962). However, reporters and photographers get on planes too, as witnessed by the deluge of media attention given to the Sundance and Cannes Film Festivals.

Conclusions and trajectories for future research

Star networks operate on two levels. On the individual level, geobehavior is a signal of a star’s type of status (media versus industry, or perhaps both). The negative influence of a particular place on media status may be explained by the location’s lack of media attention or lack of prestigious industry events. In other words, there is an opportunity cost to an individual’s star status of showing up in places that lack a film industry social milieu or flashing camera lights. Although in our analysis we looked at film stars, we speculate that similar dynamics between industry and media status can be observed in other cultural industries. In the aggregate, star networks reinforce themselves and the resulting dominance of the small number of hubs in which they are embedded. Undoubtedly, if stars show up en masse in the same places, at the same events, and attain important economic benefits because of their attendance, they will show up again. The media also showing up reinforces the importance of the attendees, the event, and the places, and further reaffirms these hubs’ top positions in the global hierarchy. This link between place and product is particularly profound in the cultural industries (Molotch, 2002). Agglomerations matter to all industries, but the place branding of particular people (ie, ‘stars’) and their goods (whether fashion, art, or movies) may matter more for taste-driven industries that rely on ‘buzz’ and ‘certifiers’ to discern which goods are ‘better’ than others (Becker, 1982; Caves, 2000; Currid, 2007; Currid and Williams, 2010). Cultural industries also tend to cross-fertilize and fuel one another’s milieus, for example, film stars show up to fashion shows and art openings, and artists collaborate with fashion houses for specific products. Thus the presence of cultural stars in general, regardless of their industry, can help auxiliary industries that benefit from the media attention that additional stars bring.

This research is rooted in a qualitative realm of social interaction and cannot, and is not intended to, support evidence for causality. This inconclusiveness encourages future research, particularly with regard to the origins both of star markets and of the stars themselves. Further quantitative research can support our early findings, particularly with regard to the influence of particular events (eg, the Sundance Film Festival) or the lack of photographic interest in particular regions or facets of the cultural industries (eg, Bollywood). Getty Images provides empirical evidence on the dominance and high connectivity of a few cultural hubs, reaffirming a general consensus in the ethnographic and theoretical literature. A priori, one can speculate about the hierarchy of cultural hubs, but to construct the connectivity and social ties from unobtrusive 'big data' is a much more difficult task.⁽³⁾ The use of 'big data' as a proxy for presence reveals many aspects of the soft economic forces [eg, publicity, social networking, and social institutions (see, for example, McNamara, 2009)] that drive the cultural industry market. This type of data and methodological approach are unconventional in the economic geography literature but may provide a new lens to aid in our understanding of regional and urban competitiveness and agglomeration. These new methods thus provide nuances to our understanding of world cities, cultural agglomerations, and uneven economic geography. While there are only a small number of major star markets, there are quite a few niche cultural hubs that have capitalized upon specialized aspects of the cultural industries. Thus the larger question for uneven development is not just how competitive advantage stays put, but how other locales can participate in or reconstruct this global hierarchy and how much capital—star or otherwise—is needed to do so.

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⁽³⁾ 'Big data' is a term to describe very large, sometimes hard to manage, datasets; see "Community cleverness required" *Nature* **455** (7209), 4 September 2008.

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