

Global Value Chains and Local Cluster Development: A Perspective on Domestic Small Enterprises in the 3D-Animation Industry in Colombia

Cadenas de valor globales y desarrollo de *cluster* locales: Una mirada a pequeñas empresas colombianas de la industria de animación en tercera dimensión

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Abstract

This article draws on the framework of the “global value chain” to describe local cluster development in the 3D-animation industry in Colombia. It is argued that the participation in global value chains can have a positive impact on cluster growth and innovation, and the individual firm as well. Porter’s diamond is used to illustrate the characteristics that drive dynamic cluster development in this case and to point out the necessary policy recommendations for further enhancing the linkage of the 3D-animation cluster into global value chains.

Key Words

Global value chain, cluster development, linkages, animation industry.

Resumen

Este artículo utiliza el concepto de “cadena de valor global” para hacer un análisis de cómo se desarrolla en Colombia el cluster de animaciones 3D. Se argumenta que la participación en cadenas de valor globales trae un impacto positivo al crecimiento y la innovación del cluster, e igualmente a sus empresas. El artículo utiliza la representación de diamante presentada por Porter para mostrar las características que influyen positivamente en el desarrollo de este cluster en específico y para identificar recomendaciones a nivel de políticas necesarias que pueden mejorar la inserción del cluster de animaciones 3D en cadenas de valor globales.

Palabras clave

Cadena de valor global, desarrollo de cluster, *linkages*, industria de animación.

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1. Introduction

Globalization of production and trade has led to a vertical disintegration of transnational corporations (TNCs) and a general fragmentation of production processes across firms and countries (Gereffi *et al.*, 2005; OECD, 2007; UNIDO, 2004). As such, TNCs focus on their core competences and higher value-added activities of the value chain, such as research and development, marketing and service activities. Non-core activities are increasingly outsourced to supplier networks of competitive local small- and medium sized enterprises (SMEs) (UNCTAD, 2000).

The vertical disintegration of TNCs provides new business opportunities for many SMEs. Especially through supplier linkages with TNCs local SMEs from developing countries can internationalize faster, diversify their exports, and gain new resources (financial, technological), capabilities and skills, all contributing to enhance local and international competitiveness of SMEs. However, local SMEs from developing countries initially often remain de-linked because of production capacity restrictions, and resource and capability constraints to meet stringent production requirements and standards of TNCs (UNCTAD, 2000; UNCTAD, 2006).

In such a context of production process fragmentation, global value chains (GVCs) can be understood as vertically interrelated productive activities performed by enterprises in different geographical locations to bring out a product from conception to complete production and distribution to the final consumer (Gereffi, 1999; UNCTAD, 2007, 3).

Giuliani *et al.* (2005, 3-4) emphasize the importance of linkages between GVCs and local clusters of firms as a way of upgrading — making better products more efficiently and moving into more skilled activities along the value chain. Hence, upgrading can be considered as a concept of innovating to increase value added. Porter (2000, 16) also stresses the importance of external linkages of clusters, stating that “clusters are a driving force in increasing exports and are magnets for attracting foreign investment”. Along the same line of thought, the United Nations Conference on Trade and Development (UNCTAD) considers the development of industrial clusters as crucial for the successful integration of local SMEs from developing countries into GVCs, due to the advantages in increased economies of scale, benefits of skilled labor and a network of enterprises that cooperate in complementary areas of specialization (UNCTAD, 2006, 5).

The present article describes how the 3D-animation industry cluster in Colombia integrates into two distinct GVCs, namely the Advertising GVC and the Television GVC. Therefore, the author draws on (global) value chain analysis as a methodological tool to detect their structures, governance issues, and the cooperation dynamics within the GVCs. Moreover, Porter’s diamond is used to illustrate necessary policy measures that might enhance integration of the cluster into the GVCs.

2. Literature review

According to Dembinski (2005, 7-9), the concept of GVC can be associated with three lines of research: 1) managerial (*e.g.* supply chain management), 2) industry economy and development, and 3) territorial and cluster. These three lines of research distinguish themselves not only in the method applied and the type of conclusions they aim to draw but also in the “entry point” to the problem.

Whereas from a managerial perspective, the level of analysis is the firm itself (such research focuses strictly on questions regarding firm efficiency, competitiveness and problems related to management techniques), the industry economy and development research stream, and the territorial and cluster viewpoints analyze GVCs at the industry level. The focal point of this research constitutes the 3D-animation industry cluster in Colombia; therefore, managerial literature and research is not taken into account.

The industry economy and development perspective looks at inter-industry linkages in an input-output sense, the distribution of functions (research and development, production, marketing), and the relationship among different tiers of suppliers and distributors (Dembinski, 2005, 8). Based on studies of coordination systems that shape such input-output linkages in the automobile and textile sectors, Gereffi *et al.* (1994) developed the framework of the Global Commodity Chain (GCC). This framework emphasizes the importance of coordination across firm boundaries and the emergence of global buyers, such as retailers and brand marketers, as key drivers that shape globally dispersed and organizationally fragmented production networks.

The GCC framework distinguishes two groups of lead firms: producer-driven and buyer-driven commodity chains (Hansen and Kuada, 2006, 41). Capital-intensive producer-driven GCCs, such as the automotive and aircraft industry, are characterized by extensive international subcontracting, high degree of centralization and control of the lead firm, and reliance on economies of scale to reduce overall transactional costs. Labor-intensive buyer-driven GCCs are dominated by large buyers that capture much value added from research and development and marketing. Typical examples include the industries of agro-food, textile, apparel, footwear, and furniture. Usually, firms from developing countries are part of labor-intensive buyer-driven GCCs (UNIDO, 2004, 12). The GCCs framework, however, did not adequately address the network structure of firm interrelationships that field research uncovered. Therefore, some authors expanded on Gereffi's framework easing the hierarchical nature of value chains and commodity focus of the framework and introduced the concept of GVCs (Humphrey and Schmitz, 2000, 2002; Sturgeon, 2000).

The term GVC can be considered a framework based on the notion of a value-added chain and the organization and disintegration of global production (Gereffi *et al.*, 2005, 79-80). As such, Kogut (1985, 15) defines a value-added chain as "the process by which technology is combined with material and labor inputs, and then processed inputs are assembled, marketed, and distributed. A single firm may consist of only one link in this process, or it may be extensively vertically integrated". Arndt and Kierzkowski (2001) use the term "fragmentation" to describe the international dimension of the physical separation of different production processes and its integration into global cross-border networks, and Feenstra (1998) discusses "disintegration of production" caused by the "integration of trade" in the global economy.

Humphrey and Schmitz (2001) argue that, in addition to the firms in the value chain, non-firm actors, such as governments and international organizations, can play a decisive role, and thereby extend Gereffi's GCC framework. As value chain analysis focuses on the nature of the relationships among the various actors involved in the chain, the concept of "governance" becomes crucial. Coordination may occur through arm's-length market relations or non-market-based relationships. Non-market-based relationships can be distinguished as (Humphrey and Schmitz, 2000):

- a) *Network*: cooperation between firms of approximately equal power that share their competencies within the chain.
- b) *Quasi-hierarchy*: relationship between legally independent firms that are subordinated to each other with a leader in the chain defining the rules.
- c) *Hierarchy*: vertically integrated production chain with head office and wholly foreign-owned subsidiaries.

The developmental implication of participation of SMEs and local clusters in GVCs is often referred to as “upgrading” — making better products more efficiently or moving into more skilled activities by the SME along the value chain (Giuliani, 2005, 4; Hansen and Kuada, 2006, 42-44). As such, upgrading is linked to the process of innovation and can be defined as “innovating to increase value added”. Therefore, competitive advantage on the firm-level can be acquired through upgrading, that is moving along the value chain into more skilled and knowledge intensive activities. Humphrey and Schmitz (2000) distinguish between four kinds of innovations:

- a) *Process upgrading*: producing more effectively; transforming inputs into outputs more efficiently by reorganizing the production system or introducing superior technology.
- b) *Product upgrading*: moving into more advanced product lines in terms of increased unit values; improving old products through quality and price performance and time to market.
- c) *Functional upgrading*: moving into new functions in the value chain; acquiring new, superior functions in the value chain, such as design or marketing and abandoning existing low value-added functions (e.g. moving from maquila to full-package manufacturing in the textile industry).
- d) *Inter-chain upgrading*: moving to a new, more profitable value chain where higher rents can be captured (for example, Taiwanese firms moved from the manufacture of transistor radios to calculators, to TVs, to computer monitors, to laptops, and now to Wireless Application Protocol (WAP) phones) (UNIDO, 2004, 10).

Linking the concept of upgrading to competitiveness, developing country SMEs now face the challenge of determining how and where — in which niche market — to position themselves to reap larger rents and positive externalities that emerge in different stages of the value chain (UNCTAD, 2007, 4).

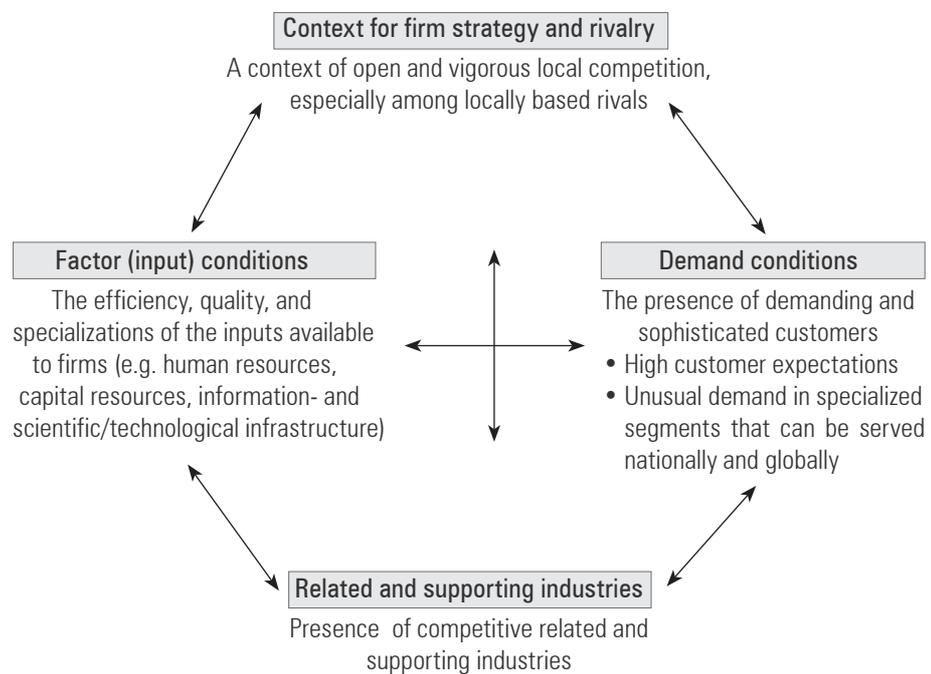
According to Porter (2000,15), clusters also play a decisive role in innovation and upgrading and can be described as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate”.

Clusters can have a positive impact on the competitiveness of the individual firm situated within the cluster. Schmitz (1995) refers to the concept of “collective efficiency” derived from local external economies¹ and joint action. Consciously pursued joint actions and incidental passive external economies (spill-over effects) between the different actors define the degree of collective efficiency of the cluster and its potential for fostering SME upgrading (Giuliani *et al.*, 2005, 3).

¹ External economies can be defined as positive or negative unpaid, outside of the market rules, and considering it as side effects of the activity of one economic agent on other agents.

Besides the sophistication of a company's operations and strategies, and the stage of development of the cluster itself, Porter (1990) refers to the quality of the microeconomic business environment that ultimately drives cluster growth and innovation, which are illustrated by four interrelated influences, graphically depicted in a diamond (see Figure 1): 1) factor (input) conditions, 2) context for firm strategy and rivalry, 3) demand conditions, and 4) related and supporting industries.

Figure 1. Sources of locational competitive advantage (Porter, 1990)



3. Methodology

The 3D-animation industry in Colombia is chosen as part of an emerging service sector in the creative and entertainment industry where the value chain shows a significant presence of independent SMEs acting as subcontractors or suppliers (OECD, 2007, 12). As such, this study contributes to a broader global research project carried out by UNCTAD-OECD-University of Fribourg and Geneva (Switzerland), entitled "Enhancing the participation of SMEs into Global Value Chains"².

The study focuses on the relationships between small enterprises from the 3D-animation industry in Colombia and their linkages to larger domestic and international clients and on the factors that influence them. Therefore, a case study approach was chosen in order to assess individual characteristics of the small firm and to analyze its relation to the large enterprise, the

² See UNCTAD (2010) for a detailed description of the results of the research project.

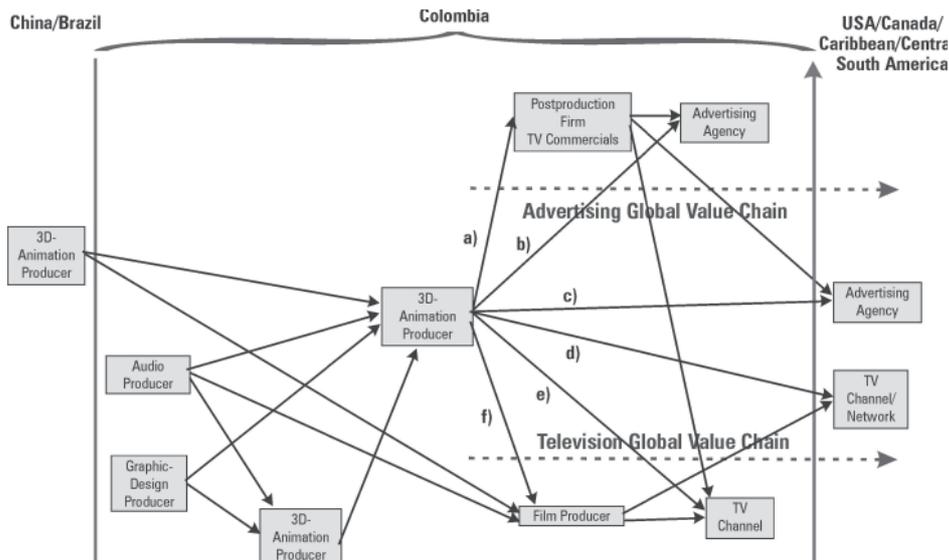
local environment, and policy support. Hence, this approach facilitates greater understanding of the issues and provides fresh insights on them (Dembinski, 2005, 9-10).

The study is based on material gathered through analysis of secondary information and questionnaires conducted with two major Colombian television (TV) channels, two film production firms, three local subsidiaries of transnational advertising agencies, four local postproduction firms for TV commercials, and five 3D-animation producers (16 companies in total). The national industry directory for cinema and television "S.O.S. Manual de Cine & Televisión de Colombia 2007" was used for firm identification and sample construction. Firm selection was dependent, for the most part, on those that met basic criteria in terms of: participation in creation, supplying and/or usage of 3D-animations, location in Colombia's capital city Bogota, or the city of Medellin, and availability of a senior manager for an interview. The interviews were guided by a semi-structured questionnaire conducted in person and supplemented, where necessary, by some further discussions via email and telephone. The following core set of questions was covered by questions put to the interviewees: a) *structure of the firm*; b) *awareness, understanding, and competition related to the GVC*; c) *cooperation within the GVC*; d) *dynamics of the cooperation, assets and competencies within the GVC*; and e) *support needed to enhance the role of SMEs in the GVC*.

4. Results and discussion

Referring to Kaplinsky's and Morris's (2001, 50) methodology for mapping (global) value chains, the "point of entry" constitutes the 3D-animation firm. As such, 3D-animation producers enter into six different relationships with clients and four with suppliers. These relationships do not only occur within national borders but also across several geographical regions, such as Asia, North-America, The Caribbean, Central- and South America (see Figure 2).

Figure 2. Global value chains for 3D-animation producers in Colombia



On the supply side, 3D-animation producers outsource mainly audio production such as voice, music, composition, and, in some cases, graphic design. Complete production of 3D-animations is also occasionally outsourced to other 3D-animation producers within Colombia as well as to countries such as China and Brazil. On the client side, 3D-animation producers enter in direct relationship with: a) national firms that specialize in the postproduction of TV commercials; b) transnational advertising agencies located in Colombia; c) transnational advertising agencies located abroad; d) international TV-Channels and Networks (CNs), mainly located in the US and Canada; e) national TV channels; and, f) national film producers.

According to the findings, 3D-animation producers act as first or second tier suppliers in the value chain; as first tier suppliers in the case of advertising agencies, advertising agencies abroad, international TV-CNs, national TV channels, and as second tier suppliers in the case of postproduction firms and national film producers.

Structure of the 3D-animation firm

Interviewed firms are structured as private limited companies. It is interesting to note that the firms were established in the years 2003 and 2006, except one company that was founded in 2000; this reflects the newness of the industry in Colombia. All interviewees affirm that the 3D-animation market is growing and that the international market (especially Canada and the US) is becoming increasingly important for business development. Indeed, some companies already have established offices in Canada and the US.

The number of employees varies significantly, between 2 and 50, and there are many freelance artists in the market. Freelancers work in some cases as suppliers for 3D-animation producers, but can also compete with them directly for major clients such as postproduction firms, advertising agencies, film producers and TV channels. Therefore, the 3D-animation market can be seen as fragmented, with a limited number of established firms of varying sizes, complemented by a scattered market of freelancers.

In general, the cost of creation or transformation of the product is clearly labor dominant. This is followed by investment in technology, both hard- and software. According to the interviewed firms, talented labor also constitutes the most important asset. Employee rotation is often a problem, especially for these small companies whose employees are often attracted by higher salaries of larger firms.

The great bulk of costs can be attributed to the actual production of the 3D-animation. Marketing expenditures for 3D-animation producers are relatively low. Interviewees indicate that most business promotion is effected through word-of-mouth communication or referrals and previously established contacts. R&D expenditures are increasingly important, as the production of 3D-animations is highly dependent on the efficient and intelligent use of hard- and software technology.

Awareness, understanding, and competition related to the GVC

Most companies interviewed are not familiar with the concept of a value chain, much less a global value chain, but are clearly aware of the immediate supplier-producer relationship. All interviewed firms consistently affirm the increased importance and demand for 3D-animations

in TV productions. This is the case not only in international markets but also within Colombia. However, many companies still consider the international markets, especially the US and Canada, more attractive for animated products because of their higher demand, better margins, and Colombia's price competitiveness compared with local suppliers in these markets. Competition is equally strong for 3D-animation producers, postproduction firms, advertising agencies, and film-producers in the national market and even more so in the international markets as these companies participate in GVCs; hence, facing global competition. It is interesting to note that in some cases Colombia serves as a so-called "creative hub" for transnational advertising agencies, which means that most creative work is designed and produced in Colombia for major transnational accounts located in the Caribbean, Central- and South America; that gives Colombia a local advantage over other countries in the region.

Cooperation within the GVC

Production is outsourced based on specific projects, and contracts are assigned for a specific piece of production. Long-term contracts do not exist. Although most firms express a high level of independence from their clients, many companies state they wish to establish a long-term based relationship to provide a more stable client base and revenue flow. 3D-animation firms are fully independent regarding their choice of suppliers and production processes applied. Only in one case, a major US-based TV channel recommended, but did not oblige, the use of a supplier based in Brazil.

For many 3D-animation producers and in one case for a film producer, it makes a difference if the client is national or international. International clients are seen in all cases to be more demanding in terms of quality, especially in the case of international TV-CNs. Interestingly, in such cases, spill-over effects in form of technology transfer occur through constant feedback from the client side on how to improve certain creative work and/or animation design processes. In one case, the Colombian film producer also participated in a workshop offered by a US-based TV channel on topics of quality control and proposal presentation.

Aside from the price, trust is an important factor for supplier selection and is based on the two factors of quality and delivery time. Price, however, is more important for national than international clients, as two respondents confirmed. Suppliers that enjoy a trustful relationship with their clients are also favored in terms of contracts. In such cases, the 3D-animation producer takes a rather reactive than proactive position regarding new contract acquisitions.

Suppliers frequently mention the importance of corporate image that a relationship with a major national or international client brings with it. Being a supplier of one of the two major national TV channels, a big transnational advertising agency, and/or an international TV-CN has a positive impact on the supplier's reputation and facilitates future business opportunities with other firms.

Dynamics of the cooperation, assets, and competencies within the GVC

The majority of firms interviewed do not belong to any industry association. According to many interviewees, the absence of such associations in the country often contributes to

the lack of industry standards and regulations (*e.g.* price regulations), which in turn leads to “obscure” business practices.

Cluster development can be observed, on the one hand, based on inter-firm cooperation and, on the other hand, based on geographical proximity. The following cases occur: Two postproduction firms for TV commercials share one major international account for advertising production in Latin-America; one 3D-animation producer sub-rents office space to two of its suppliers; in some cases, film producers and postproduction firms rent technical equipment to each other; in many cases, if one firm reaches capacity limits, it outsources certain 3D-animation production to competitors.

The majority of firms interviewed are located in the country’s capital city of Bogota, which is also Colombia’s biggest and most economically active city, followed by the city of Medellin, where the rest of the firms are located. Typically, 3D-animation firms and their suppliers are located in the same city (even neighborhood). Therefore, geographic proximity can be considered as an important factor for successful business relationships.

The driving factor behind outsourcing of 3D-animations for the two national TV channels lies mainly in the degree of specialization of many 3D-animation firms. Officials from both channels indicate that their suppliers are more specialized in their technical equipment, and therefore, own investment in such technology would not be justified. Furthermore, interviewees from both channels stress the excellent human resource talent of their suppliers.

In fact, when asked about key assets of 3D-animation producers, all interviewees recognize the importance of talented personnel and technological equipment, but clearly highlight the human resource factor. The majority of people working with 3D-animations either studied publicity or graphic design at Colombian institutions of higher education. Nevertheless, specific software capabilities for 3D design are mainly self-taught.

Regarding key strengths, all suppliers point out creativity, quality, delivery time, and price as important. Especially for international markets, 3D-animation suppliers perceive that price is an important competitive factor because of labor cost advantages in Colombia. Besides the aforementioned key strengths, some suppliers also consider their English language abilities as a strength and competitive advantage for conducting business with international clients. In three cases, the 3D-animation producer and postproduction firms also have offices abroad, in the US, Canada, and Venezuela. Such an international presence is also regarded as a strength, and, especially in the case of Canada and US, the firms consistently confirmed the positive learning effect from the market and its clients.

Most 3D-animation producers consider the increased competition from India and China as a threat for their position in the GVC. However, many US-based TV-CNs tend to favor Hispanic producers for their Latin-American productions because of cultural affinity, as three interviewees confirmed. Besides, many suppliers fear not being able to maintain the rapid pace of technological innovation and to possess the financial resources necessary to acquire the latest hard- and software technology. One firm that acts as a supplier for a major television channel in the US highlighted the fact that its greatest concern is becoming repetitive in its creative work. According to the interviewee, clients often change suppliers if current suppliers lose their capabilities for creative innovation. In the case of postproduction firms, the interviewees consider the increased presence of foreign-affiliated postproduction companies as a threat of increased levels of competition in Colombia.

The bulk of firms indicate that strengthening their role in the GVC requires investment in personnel training and hard- and software technology. Since talented personnel is regarded as a key asset of the firm, successful recruitment is also necessary to increase the company's role in GVCs. In one specific case, the founder of a 3D-animation company is a former employee of a major US-based television channel. As two other interviewees confirm, such linkages are not unusual — former employees of larger client companies set up their own businesses to work as suppliers for their former employers.

Support needed to enhance the role of SMEs in the GVC

None of the firms interviewed received any kind of support from the Colombian government. In two cases, companies inquired with the Ministry of Commerce and the Colombian Export Promotion Agency, Proexport, but could not get any satisfying answer or help.

In a telephone inquiry with Proexport in March 2007, the official indicated that so far no major support was given to the television industry but that they were considering it. Many interviewed firms see Proexport as the key governmental player to promote and position the Colombian 3D-animation business in international markets through trade-fair participation and organization of industry specific showcases.

3D-animation producers mention several issues as important in becoming more competitive in international markets and to increase their participation in the two GVCs:

- Government could promote local talent more vigorously. According to several interviewees, there is a lot of creative talent in Colombia, but many people do not have access to adequate training because of financial limitations. As most training for 3D-animations is provided by private universities and institutions, this is a major restriction for people who cannot afford high tuitions.
- Tax benefits could also be implemented by the government in two ways. On the one hand, tax reductions for the acquisition of technology (hard- and software) and, on the other hand, tax reductions for 3D-animations that are supplied to international clients.
- Some interviewees suggest that government could provide access to special financing for hard- and software investment.
- Since many foreign governments apply visa restrictions on Colombian citizens, many Colombian workers cannot visit clients abroad.
- One interviewee also refers to the government imposed restrictions on the number of foreigners allowed to work in a Colombian company. Such restrictions can prohibit further business development of many companies if they are not allowed to hire foreign workers.

Interviewed firms also indicate that Colombian 3D-animation producers, postproduction firms and film producers increasingly gain reputation abroad for the quality of their work and competitive prices. This is especially the case among Latin-American countries and the US. However, the general negative country image (an image often related to drug-trafficking and violence) disfavors the industry. In that sense, Proexport could play an important role by facilitating the promotion and positioning of the industry in international markets.

5. Conclusions

As this study reveals, the vertical disintegration of TNCs and the fragmentation of production processes in the creative/entertainment industry include small firms and even micro-enterprises with less than 10 employees. These firms are even spread over different locations (countries) of a whole continent (the Americas).

Both GVCs (Advertising- and Television GVC) can be considered as buyer-driven value chains dominated by large clients, namely advertising agencies and TV-CNs, with their core competencies in branding and marketing. These large client firms also coordinate and control the production process within their respective value chain. This is in line with UNIDO (2004, 12) that argues that developing country producers tend to be part of buyer-driven rather than producer-driven chains.

Regarding the governance structure of both GVCs, a “quasi-hierarchy” can be observed as 3D-animation firms maintain their legal independence but are subordinated to the leader or “governor” (mainly advertising agencies and TV-CNs) of the chain.

Process- and product upgrading is mainly observed in the Television GVC: Process upgrading in form of client feedback and training on quality aspects of the delivered product. Product upgrading takes place in the form of more added value to the product to be delivered. The Advertising GVC, however, is characterized by a more dominant role of the client, giving detailed and specific instructions, leaving, therefore, less room for supplier creativity (compare to “maquila” versus “full-package” manufacturing in the garment industry). These results partially reflect, for the TV GVC at least, what Giuliani *et al.* (2005, 17) identified in Latin-American software clusters where product and process upgrading are considered as generally high. Therefore, it can be assumed that upgrading of individual firms within a cluster depends on the type of industry of the specific GVC (Advertising versus Television GVC in this case).

As previously mentioned, cluster development is occurring based on inter-firm cooperation and on geographical proximity among 3D-animation producers and their suppliers. In that sense, “collective efficiency” is derived from joint actions of inter-firm cooperation within the cluster and passive external economies in the form of “spill-over effects” mainly from international clients within the GVC. This leads to the conclusion that external linkages, such as the linkage of the cluster itself into a GVC, can be considered as an important trigger for firm and/or cluster upgrading.

Related to Porter’s diamond, Colombia’s 3D-animation cluster shows a high potential for growth and innovation due to its “dynamic” characteristics (see also Sölvell *et al.*, 2003, 18-20): a) Evidence of strong local rivalry among 3D-animation producers, such rivalry becomes even more intensive through participation in GVCs as competitors are not only local or national but international; b) more specialized and advanced factors of production, such as talented/qualified personnel and sophisticated technological equipment than their national and international clients; and, c) presence of highly demanding and sophisticated buyers, especially international clients, in both GVCs. This leads to the conclusion that the participation of a local cluster in a GVC stimulates the creation of a dynamic cluster environment and, hence, positively drives cluster growth and innovation.

6. Policy implications

As the conclusions have shown, the participation of the local 3D-animation cluster in GVCs can provide substantial benefits to cluster development and to the individual firm as well. Three out of four elements of Porter's diamond show evidence of a dynamic characteristic that positively impact cluster growth and innovation. However, the development of such dynamic characteristics is mainly driven by cluster participation in international markets through GVCs; merely focusing on the national market would not sufficiently drive dynamics due to a lack of sophisticated local demand and rivalry. Consequently, cluster development initiatives should also take into consideration cluster internationalization through its linkage into GVCs — the dynamics of global markets can positively affect local cluster innovation, growth and upgrading as the results of this study reveal.

"Related and supporting industries" (see Figure 1), however, are rarely connected to the 3D-animation cluster. Relevant policy measures should therefore focus on strengthening the linkage of the cluster with stakeholder institutions, such as chambers of commerce, business support organizations (*e.g.* Proexport), local universities, and other related research institutions.

As business promotion activities and related policies are not only pursued by national governments, but increasingly by local institutions, local governments in both cities of Bogota and Medellin should pay more attention to the development and promotion of this specific cluster. Especially for global buyers, a cluster is easier to spot than an individual firm, and derived competitive advantages through collective efficiency make the cluster more attractive for the international buyer and even foreign (direct) investment.

The diversification of exports, especially the promotion of non-traditional exports, including services, is increasingly important for the Colombian government. In this regard, the 3D-animation industry has a high potential to contribute to such diversification if policymakers understand the opportunities and driving factors behind both traditional (mature) and emerging sectors that offer SMEs the potential to integrate successfully into GVCs.

7. Future research

This study focuses exclusively on 3D-animation firms located in the cities of Bogota and Medellin in Colombia as the "entry point" of two GVCs of the emerging creative/entertainment industry.

Future research should expand the geographical perspective of this study and include firms from other Colombian cities and even the region where 3D-animation firms are emerging, such as Argentina, Brazil and Mexico (see Cardona *et al.*, 2007). A country comparison could provide further useful insights into the dynamics of cluster linkages with GVCs in that specific industry. Furthermore, an analysis of the emerging film and entertainment industry in Colombia could provide ideas for new "entry points" and other interesting clusters worth studying (*e.g.* games software industry).

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