THE IMPACT OF COLLABORATIVE INNOVATION ON THE CULTURAL INDUSTRIES' EARNING FUNCTION IN A DEVELOPING COUNTRY

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ABSTRACT

This article identifies the effects of collaborative innovation on the earning function of cultural industries in a developing country which is Cameroon, subject which has not yet been tackled in this geographical area. The use of a logit model provides a low probability of artist satisfaction of about 46.11%, deteriorated mainly by economic, financial and individual factors. As for the factors of collaborative innovation, they provide positive effects as the following: -the functioning of artists in creative and production cooperatives improves their perception of gain by 12.15%, -the membership of a formal industry in a dissemination of knowledge and innovation improves its level of gain by 13.42%, -subsidies to production and creation from patrons lead to an improvement in their gain of 27.17%. On the other hand, industries that receive government subsidies see a significant reduction in their gain of 37.79%. This requires an improvement of the incentive framework set up by the State.

Keywords: collaborative innovation, cultural and creative industries, cultural sector, cultural entrepreneur, digital technology.

Code JEL : Z11, Z18, L23, O31, O36, P14

INTRODUCTION

Cultural and creative industries include activities in which the product or service incorporates artistic or creative elements that convey cultural values (Caves, 2000). According to the author, these are activities in the fields of publishing, live performance (theatre, concerts, etc.), visual arts (painting, sculpture, etc.), the music industry, film, games, television and fashion. Collaboration for creation, production and innovation is

at the heart of the development strategies of these industries. Indeed, their activities are organized by sector [1] and the products they offer incorporate different tasks. Every cultural actor of a specific specialty collaborates with a link in the chain that is of different[2]specialty.

Faced with the changes resulting from the digital revolution, they are organized within collaborative innovation spaces (CIS) to create new business models. These are executives, private or public initiatives, that provide cultural actors with spaces equipped with digital control machines such as laser cutter, vinyl cutter, miller, etc. (Lhoste and Barbier, 2016). They are created and animated by individuals (artists, engineers, amateurs, employees, etc.) who are guided by a spirit of democratization of knowledge and know-how. Introduced in the United States at the Michigan Institute of Technology (MIT) around 1998, today, with great speed, they have taken shape in almost all developed countries (see Lhoste and Barbier, 2016, Ferchaud, 2018).

The organization of cultural actors within the CISs also allows them to pool their knowledge and the factors of production that each of the actors holds (Chapain et al., 2018). This leads to the development of high value-added cultural products or services, widely available to consumers at reasonable prices (OIF-CEIM, 2016). Often, within these CISs, cultural actors combine new and old technologies (Gunthert, 2011; Kurt, 2015) to improve existing business models. To do so, they opt for technical protection measures whose role is to compel counterfeiters to buy their products (Shapiro and Varian, 1999). The effectiveness of this organization around CISs is sometimes called into question because of new

[1]The UNESCO sets six: -The music industry and live entertainment industry; -The Edition and digital industry, -The cinema and audiovisual production industry, -The media and communication industry, -craft industry and the antiques trade, then visual and graphic arts.

[2] For example, the production of a record requires the profession of music artist, music producer, phonographic editor and that of record distributor. That of architecture; the architect, the mason, the carpenter, the painter, ...

practices of consumption of cultural products on the Internet and counterfeiting (Labadie and Rouet, 2007, Benhamou, 2017).

Indeed, the 2010 British Recorded Music Industry (BPI) report, cited by Dzomo-Silinou (2011), shows that*"album sales fell by 7% and blamed illegal music downloading."* In France HADOPI (2019) asserts that illegal practices of consumption of dematerialized cultural goods remain high despite digital protection techniques. For example, respectively 55%, 27%, 22% of consumers illegally download films, music and video games. And 50% illegally consume TV shows, 36% books and comic strips and 29% of sports.

In Africa this situation is more critical. According to Mboua Nkoudou (2018), the place of CISs in the success of cultural activities seems to be a myth on this continent, because the way they are thought of and conveyed at present leads to the claim that they are part of a utopia that will have a hard time realizing. In practical terms, according to the latter, although African cultural actors are *"affected by a powerful potential capable of boosting an innovation that corresponds to the needs of African populations"*, the CISs set up *"are not designed on socio-cultural bases specific to Africa"*. Moreover, the study conducted on this continent by D'Almeida and Alleman (2004) shows that pirated cultural products represent 20% of the global CD market. In Cameroon, in particular, Petsoko (2010) argues that piracy of works of the mind constitutes a gangrene in the cultural and artistic microcosm. There is a proliferation of pirated CDs, DVDs and video as a result of illegal downloads.

This leads to an analysis of the effects of collaborative innovation on the economic performance of the cultural and creative industries of this developing country. This analysis deserves to be carried out by emphasizing the organization of cultural actors in professional association for the defense of their copyrights. Indeed, as Leyronas et al. (2018) point out in a study on Africa, collaborative innovation within CIS

refers to *"the collective management of a resource by a community that sets ad hoc rules and establishes a governance structure allowing the distribution of different levels of rights and obligations and conflict resolution"*.

The aim of this article is, therefore, to investigate the effects of collaborative innovation on the earning function of the cultural and creative industries in Cameroon, which is an African country.

Its interest lies in its ambition to fill the void in this type of study on this continent. Instead, authors who have been interested in this field have analyzed the access rates of digital technologies in the economy (Diagne et al, 2009; Aissaoui and Ben Hassen, 2016), the fragility of Copyright Management Societies (CMS) and their inability to effectively manage copyrights (D'Almeida and Alleman, 2004), the poverty of artists, the informal exercise of cultural activities, the scarcity and low level of funding received by cultural entrepreneurs (Balamine and Mballa, 2010).

To achieve the objective, data from a 2011 survey of cultural professionals conducted by the International Organization of Francophonie (IOF), with the assistance of Cameroonian authorities, cultural professionals and consultants, will be used. These data capture the characteristic factors of collaborative innovation in the cultural and creative industries: 1) the types of materials used to create and disseminate products. 2) The ability of cultural actors to collaborate with fund holders, as measured by funding sources, explains their membership in work networks. 3) The operating cost chosen for creation. A cooperative choice allows the means of production to be pooled. 4) Membership in the CMS determines the degree of collaboration of cultural actors not only with each other but also with the public authorities. This is a situation that generates network externalities and promotes the increase in the remuneration of cultural actors.

To measure the effects of these factors on the earning function of cultural industries, we use a logistic

regression, because the qualitative variable that measures the gain has been dichotomized. The rest of the article is organized as follows: Section 1 presents the literature review. Section 2 details the methodology chosen and Section 3 presents the results of the study.

LITERATURE REVIEW

On the one hand, this review serves to understand the concept of collaborative innovation and its importance for companies that collaborate. On the other hand, it aims to show that collaborative innovation is at the heart of the growth of cultural industries. But it also presents the other factors that explain the economic performance of companies that we encounter in the literature.

Apprehension of the Concept of Collaborative Innovation.

To better understand the concept of collaborative innovation, it is interesting to first review the concept of collaborative innovation spaces (CISs) before exposing its role in an economy.

The concept of collaborative innovation spaces (CISs).
This concept is an extension of the phenomenon of business agglomeration first studied by Marshall (1890) under the concept of "industrial districts"[3] and then popularized by Porter (1990) as a "cluster". Einright (1996) and Ketels (2003) have shown that, apart from these, several authors have given different names to this phenomenon[4] and, therefore, definitions that correspond to their objectives. This multitude of definitions is actually due to the heterogeneity of clusters. They differ from the type of goods or services they offer, the

[3] Industrial districts are productive and geographically defined systems, characterized by a large number of small and medium-sized firms that are respectively involved in the different steps that contribute to the production of a homogeneous product.
[4] For example, the notion of techno pole by DATAR in France.

localization process to which they are subjected, their stage of development and their environment (Daidj, 2011). The latter states that, despite these different definitions, a cluster is characterized by four dimensions: "*-clusters are clusters of companies and institutions (universities, research centres, professional organisations, etc.) located in a specific region and in a given sector or in related industries; -companies have similar activities, can share the same area of expertise, produce related or complementary goods; -the actors in these clusters are closely linked and establish horizontal and vertical relationships of different nature (subcontracting, cooperation, etc.), however they do not cooperate systematically; -geographic concentration creates positive externalities that are linked to access to specific tangible and intangible resources but also to fundamental skills*" (Daidj, 2011, p.109).

Today, with the development of digital technologies and the internet, new CISs have emerged. Fabbri et al. (2016, p.2) claim that these technologies have fostered the emergence of four types of CIS: *"-multi-company workspaces (co-working spaces, Learning labs, startup incubators), -manufacturing workshops (FabLab, Makerspace, Techshop, Hackerspace), -research and innovation laboratories (Research and Development Centre, Innovation Lab) and public experimentation spaces (Living lab, etc.)* ». The operation of these CISs is based on the pooling and exchange of services, resources, goods, time, knowledge and skills with other actors outside the entity; that is the company or a research organization (Massé et al., 2016). This pooling of production factors and the exchange of knowledge within these CISs have led to the introduction of the concept of a "collaborative economy" (Bostman and Rogers, 2010). Authors also use the term "collaborative innovation" to characterize the functioning of CISs (Bottollier-Depois, 2012; Rampa, 2015; Masse, 2018).

Indeed, CIS is a workspace where collaborative product creation facilitates innovation (Scaillerez and

Tremblay, 2017). They facilitate learning through practice and skills sharing (Bosqué, 2015). Troxler and Wolf (2010) are of interest to the CIS by stating that within them, each person, having an idea, has the opportunity to take advantage of this space to test that is to say a prototyping of the physical or digital object that he would like to produce. Once the prototyping is successful, it can create this object freely and quickly, because the place makes the necessary means available to those who frequent it.

However, CIS managers in their operating system must meet the criteria they have set. For example, a 2017 report by Deloitte Sustainable Development on behalf of ADEME presents on page 20 three criteria inspired by the FabLabs charter: 1-The pooling of resources and dissemination of knowledge, know-how and projects. 2-Inventions can be protected but remain available so that everyone can use and learn from them. 3-Commercial activities must grow outside the Lab[5], but benefit the inventors, Labs and networks that have contributed to their success. CISs are therefore open spaces with sophisticated equipment that allows individuals wishing to produce physical or digital goods to access manufacturing or production capabilities. This leads to an analysis of the role of collaborative innovation in an economy.

The importance of collaborative innovation for businesses. It has just been mentioned that collaborative innovation is at the heart of how CISs work. It is seen as a lever for companies to strengthen their capacities for innovation, access new skills and control costs in uncertain markets (Saunière and Leroyer, 2012). Described as a reformist movement, it takes place on the political and organisational governance of the company (Sundararajan, 2016) and on new solidarity. In other words, it implies that the companies that frequent the CISs join forces and reach an agreement on the

[5] To designate all CIS.

management of the intellectual property of their projects. Often, this agreement involves risk sharing, pooling of resources and profit distribution.

Saunière and Leroyer (2012, p.12) present the strategies that CIS member companies adopt to reap the benefits of working with other structures. They show that companies opt for one of three approaches: "*-the* inside-out approach *in* which the structure collaborates with external players to bring an in-house *innovation to the market in order to enhance it; -the* outside-in approach *where* the company uses *external actors to integrate their knowledge into its innovation projects and; -the* joint approach in which the *structure collaborates interactively with partners, through an exchange of knowledge to develop an* innovation." These different approaches help to stimulate the growth of companies that are in a collaborative situation (Burger-Helmchen et al., 2013). The benefits of such collaboration for a company can be seen in the commercial, organizational, technological, environmental and societal domaine (Denervaud et al., 2010; Laperche and Lefebvre, 2012; FIM[6], 2016; Academy of Technology, 2017; Servajean-Hilst et al., 2018).

In terms of markets, collaborative innovation is of interest in that the partnership association allows them to strengthen their position and gain market share. And, especially for a small and medium-sized company/SME, partnering with its client in an innovation project is synonymous with a commercial force that cannot be doubted (FIM, 2016). This association gives it a competitive advantage by raising it to a favourable position in the market where it offers the product resulting from the collaboration. In a nutshell, collaborative exchanges between partners allow everyone to better understand the market and benefit from reduced project costs, product delivery times and risks. At the organizational level, collaboration allows

[6] Federation of Mechanical Industries.

SMEs to benefit from existing resources and skills in large companies (Servajean-Hilst et al., 2018). These are the resources required to manage a collaborative project, but are rare in SMEs. However, collaborative projects can often be an obstacle, especially when the consortium is made up of too many people. A large number of people can, in fact, cause red tape. In terms of technology, collaboration allows SMEs to access the skills and technological means they do not have at their disposal (Academy of Technology, 2017).

From the same perspective, open collaboration can also benefit a large company. In this way, it can seize this opportunity to embark without fear on high-risk innovation spending that will enable it to maintain its competitiveness. From an environmental point of view, collaboration helps to address the environmental issues that need to be addressed. Indeed, collaborative situations facilitate the implementation of environmental audit recommendations, as CIS companies are divided into the burdens to bear. This is why public calls for projects generally incorporate this aspect of collaboration into their selection criteria (Laperche and Lefebvre, 2012). At the societal level, collaboration between organizations of different cultures and professions fosters social harmony, enhances human relations and is a source of progress (Denervaud et al., 2010). This review of the literature highlightes the value of collaborative innovation for the companies that adopt it. What is its contribution to cultural industries?

Collaborative Innovation, a Growth Factor for Cultural and Creative Industries

Collaborative Innovation is at the heart of how cultural and creative industries work (Vincent and Wunderle, 2012; LeCorf, 2013). This is a key factor affecting the production function of artistic companies (Paris, 2010; Sagot-Duvauroux, 2014; EY, 2016; Atlantic Fund, 2018). Vincent and Wunderle (2012) and Sagot-Duvauroux (2014) used the *cluster* concept to demonstrate the importance of collaborative innovation

in the cultural and creative industries. Based on the innovative aspect of clusters, Vincent and Wunderle (2012) show that cultural and creative industries work by network to improve their earnings and stabilize contractual relationships between themselves. Thus, for these authors (P.22),*"creators are very mobile, production and distribution companies are much less mobile and therefore creators tend to follow the establishment of companies and regroup."* As reputation plays a very important role in the cultural industries, the presence of artists in these central places helps to stimulate it. In the same vein, Sagot-Duvauroux (2014, p.4) states that *"cultural and especially media activities, composed of a multitude of small organizations working on projects, benefit particularly from cluster structuring, geographical proximity favouring the existence of a pool of skilled employment, the circulation of ideas, the pooling of research equipment or programmes"*.

In addition, to ensure the benefits of collaboration, artists organize themselves into specialized associations. These are intended to redistribute income from their contractual relationships fairly (Vincent and Wunderle, 2012; Atlantic Fund, 2018). For the Fonds Cre'Atlantique (2018), the collaborative nature of cultural industries is based on the fact that the creative economy takes place between several sectors and professions. The idea behind this principle is that everyone has ideas and projects with more potential to materialize and succeed together. At this level, the question of intellectual property arises on the product created. Who is responsible? Who is the main actor? How can we value it? What would be the remuneration of each player in his production? These questions are answered in the FabLabs charter (conferring ADEME, 2017). They are at the origin of the organization of cultural actors in SGDA. From this perspective, the State as a guarantor of the business environment contributes to the smooth functioning of creative industries by enacting legal texts that frame cultural professions. It also builds on the concept of

positive externalities generated by creative industries on regional economic development to provide financing to cultural entrepreneurs (LeCorf, 2013; Sagot-Duvauroux, 2014).

LeCorf (2013) shows that financial support[7] for artists and the cultural and creative investments[8] put in place by local European leaders have helped to legitimize a series of actions by the latter. According to the author, these schemes (financial support and cultural investments) have enabled local leaders to stimulate the economic development of their territories. These are factors of attractiveness to artists and economic agents (Martel, 2010). LeCorf (2013) has therefore described these devices as "cross-cutting" factors that affect the entire economic fabric. This demonstrates the interest for states to invest in cultural activities. Paris (2010, p.62) goes further by demonstrating the value of collaboration between the State and the cultural and creative sector. According to the latter, "*cultural industries are based on specific economies, in which the notions of risk, abundance, differentiation, built value are exacerbated. The challenge of public support in these sectors is then to respond to the problems of distortion of competition by budgets while strengthening the Schumpeterian model of these industries which is based on the central role of the producer*".

It is therefore obvious to remember that collaborative innovation in cultural industries takes place within the networks (cooperatives, professional organisations) in which they benefit from the pooling of digital equipment (computers, Internet, printers, etc.) and the know-how. It also takes place within the specialized associations or societies set up by cultural actors in order to protect their copyrights.

We have just grasped the importance of collaborative innovation for cultural industries. In view

[7] Subsidies, tax exemption, etc.

[8] Construction of palaces of culture, sports, creation and improvement of heritage, architectural spaces, organization of festivals, etc.

of addressing the operating criteria of the Labs, given by the MIT charter, indicators of appreciation of this type of innovation for a cultural industry can be expressed in terms of two variables: - the access to modern materials because of its membership in a group of registration with a professional organization, - the registration with an intellectual property management company or copyright management company. In a nutshell, attendance at a CIS with operating rules like those recommended by MIT is a measure of collaborative innovation.

However, measuring the economic performance of a cultural and creative industry cannot be limited to collaborative innovation factors. Beyond these factors, economic, financial and cultural actors' individual characteristics are also factors that explain the performance of cultural industries (Balasse, 1990). As the types of factors that explain the performance of cultural industries are known, the methodology used to understand their effects on their earning function remains to be presented, while emphasizing the contribution of indicators of collaborative innovation.

STUDY METHODOLOGY

As part of this methodology, the source of the data and the variables of the study are presented. Furthermore, the tool that enabled the analysis of the effects of collaborative innovation on the economic performance of cultural industries is referred to.

Source of Data and Variables from the Study

Here, the source of the data and the variables of the study are successively mentioned.

Data source. The data used in this work come from a survey commissioned by the IOF[9] in 2011 and carried out by the French cultural association called "Culture and

[9] International organization of Francophonie

Development". This association conducted this investigation with the help of Cameroonian authorities, cultural professionals and Cameroonian consultants. The survey was carried out within the framework of multilateral cooperation between the IOF and its southern member States. The aim of the IOF is to help them better understand the economic, institutional and structural realities of their cultural sectors. Because culture is now recognized as a factor of economic development. A total of 500 cultural industries have been extracted from the database resulting from this survey, which includes formal and informal structures. The questionnaires sent to the surveyed structures show qualitative and quantitative variables. On these questionnaires, there is a question that captures the respondent's opinion of his earnings after the respondent has chosen one of the proposed answers on the intervals of profits made. The question of these intervals is "How much do you estimate your annual earnings (in FCFA)?" The one related to the respondent's opinion is "How do you find these gains in relation to all of your expenses and efforts at work?" For this question, the respondent had the choice between the items "Low," "Medium" and "High". This last question shows that qualitative variable models can be used to determine the impact of collaborative innovation on the economic performance of cultural industries. Before going back on these models, it is important to present the variables used first.

The study variables. At this level, it is a question of defining the variables used, and then presenting how they have been codified based on questionnaires addressed to cultural actors. This provides a greater understanding of the use of dichotomous models in this article.

- ***Defining the study's variables.*** Table 1 below presents and defines the variables used. They are classified according to economic and financial criteria, individual characteristics and collaborative innovation. The

variable to explain is the perception of the annual gain by the cultural actors.

Table 1 Definitions of Study Variables

Variables	Definitions
1) Dependent variable	
Appreciation of annual gain	Perception of the annual gain over what is set beforehand as a goal: measures the satisfaction of the manager of the company
2) Explanatory variables	
Economic and financial factors	
Rate	Average price of cultural product captured from proposed intervals
Investment	Investment level captured from proposed intervals
Compensation for work	Workers' compensation captured from proposed intervals
Number of employees	Employee numbers captured from proposed intervals
Individual features	
Employer's level of education	**Employer's level of education:** -without or primary, - secondary,-higher
Culture-related profile	Employer's academic profile
Sector	**Industry line:** - Live music and entertainment industry, - Cinema and audiovisual production, - Edition and digital, - Media and communication, - Crafts and trade in antiquities, - Visual and graphic arts.
type-structure	**Type of structure:** - Production house/editing, - Distribution house/broadcasting, - Artists (musician, dancer, actor, writer, painter,)
Collaborative Innovation Factors	
type-materials	**Types of materials used for creation and distribution:** - Classic (drum, sickle, chisel, gouge, etc.), - Modern (computer, printer, in short digital devices), - Websites
Grant	**Funding sources for creation:** - Government (State), - Patrons (national, international, international cooperation, denominational institutions, etc., - Don't get grants
Operation	**Operating framework chosen for creation:** - Co-operative (CIG, EIG) (*), - Another formal status (**) with membership in a collaborative professional organization (PO), - Other formal statuses without collaboration, - Informal (No status).
Member of the CMS	Membership in the Copyright Management Society (CMS)

Source: Author based on data from the Cultural Profile Survey (IOF, 2011)
(*) CIG-Common Initiative Group, EIG-Economic Interest Group.
(**) Other formal statuses: Limited Liability Company (LLC), Anonymous Society (AS), Personal Name Company (PSN).

The dependent variable that is the appreciation of gain by the cultural industries being a qualitative fact, it is considered interesting to codify it as well as all the other variables, i.e. the explanatory variables.

Codification of descriptive variables and statistics. Table 2 presents the codification of the variables used and their descriptive statistics. The codes were assigned to the various responses provided by the respondents. The descriptive statistics compiled in this Table show, on the one hand, that 53.14% of cultural actors are dissatisfied with their gain and, on the other hand, that they exhibit differentiated behaviours towards cultural innovation.

Thus, 29.61% of cultural industries operate as cooperatives to benefit each other from the expertise they hold. 21.90% of them who operate formally are members of an PO in which they benefit from the expertise.

Table 2 Codification and descriptive statistics

Variables	Codification	Descriptive statistics
1-dependent variable		
Appreciation of annual gain	1 if satisfied with his gain 0 otherwise	1: 46.85 (0.0224) 0: 53.14 (0.0224)
2-Variables		
Economic and financial		
Rate	1 yes [0-15,000[2 yes [15-40,000[3 if more than 40,000	1: 31.44 (0.0209) 2: 35.09 (0.0215) 3: 33.46 (0.0212)
Investment	1 if [0-10millions [2 if [10-20millions [3 if plus 20 millions	1: 27.58 (0.0201) 2: 41.58 (0.0222) 3: 30.831(0.0208)
Compensation for work	1 if [0-1,5million [2 if [1.5-3millions [3 if more 3 millions	1: 36.10 (0.0216) 2: 34.07 (0.0213) 3: 29.81 (0.0206)
Number of employees	1 if [0- 10 employees [2 yes [10-30 employees [3 if plus 30 employees	1: 31.64 (0.0209) 2: 37.32 (0.0218) 3: 31.03 (0.0208)

Individual features		
Employer's level of education	1 if primary 2 if secondary 3 if higher	1: 32.65 (0.0211) 2: 37.11 (0.0217) 3: 30.22 (0.0207)
Culture-related profile	1 if activity-related profile 0 if not.	1: 47.66 (0.0225) 0: 52.33 (0.0225)
Sector	1 Music industry 2 Edition and digital 3 Cinema and audiovisual production 4 Visual and graphic arts 5Media and communication 6Crafts and trade in antiques	1: 15.41 (0.0162) 2: 11.15 (0.0141) 3: 06.89 (0.0114) 4: 21.09 (0.0183) 5: 15.21 (0.0161) 6: 30.22 (0.0207)
Types of structure	1 Production house/editing 2 Distribution/broadcasting house/museum 3 Independent Artists (musician, writer, painter, etc.)	1: 22.51 (0.0188) 2: 42.39 (0.0222) 3: 35.09 (0.0215)
Collaborative Innovation Factors		
Operation	1 Cooperative (CIG, EIG) 2 Formal and member of an PO 3 Formal, not a member of an PO 4 Informal (no status)	1: 29.61 (0.0205) 2: 21.90 (0.0186) 3: 11.15 (0.0141) 4: 37.32 (0.0218)
Grant	1 Government (State) 2 Patrons 3 No subsidy	1: 27.99 (0.0202) 2: 24.94 (0.0195) 3: 47.05 (0.2250)
Member of the CMS	1 if member of the CMS 0 If not.	1: 39.60 (0.0220) 0: 60.64 (0.0220)
Type of equipment	1 Modern (computer, printer, in short digital devices, etc.) 2 Classic (drum, sickle, chisel, gouge, etc.) 3 Websites	1: 32.86 (0.0211) 2: 25.35 (0.0196) 3: 41.78 (0.0222)

Typical differences in proportions are in brackets
Source: Author based on data from the Cultural Profile Survey (IOF, 2011)

These POs organize training workshops and working groups to enable their members to improve their capacity to create. On the other hand, a significant part of

the cultural industries do not work together. In fact, about 11.15% practice formally and are not members of any POs and 37.32% operate informally. Working together promotes the pooling of digital equipment (computers, internet, printer, etc.). This can be seen through the "type of hardware" factor. In fact, 32.86% of companies use these types of equipment and 41.78% exhibit their products via websites. These proportions are not far from the 29.61% of cooperatives and 21.90% of industries that are members of the POs. That's a total of 51.51%. Only 25.35% of companies still operate in a hand-made manner, using hand tools (sickle, gouge, knives, chisel, brush, etc.). These would be mainly the arts and crafts industries, with sculptors, leather goods, painters, etc.

About 27.99% receive state grants and 24.94% receive grants from patrons (national, international, international cooperation, denominational institutions, etc.). In contrast, 47.05% of industries do not receive subsidies. This means that public support schemes still exclude a significant number of cultural industries. This is due to a low affiliation rate (39.60%) to CMS. An improvement of these devices is therefore necessary.

Regarding economic and financial factors, it should be noted that in the sample used, 31.44% of industries charge prices below 15,000FCFA[10]. The majority of the craft industries (sculptors, basket makers, etc.) and distributors who retail products from the other five sectors practice low prices. The 33.46% of industries that charge more than 40,000FCFA, are mostly media and communication, publishing and digital. They are also the producers of music and films. Most of them make huge investments, pay high salaries and employ more people: 30.83% invest more than 20 million, 29.81% pay more than 3,000,000 CFAFs in wages and 31.03% employ more than 30 people.

With regard to individual characteristics, it must be said that in these sectors, in an almost fair way, there are cultural actors from different levels of school

[10] 1 Euro is 655.95 FCFA. So 15,000FCFA is equivalent to 22.87 Euros.

education: 32.65% who have primary level and who in reality are craftsmen (basket-makers, leather workers, sculptors, potters, etc.), 37.11% who have the secondary level, among which we find the previous categories and other occupations (musicians, film actors, serigraphs, painters, etc.) and 30.22% who have the higher level. In this category, there are many booksellers, publishers, producers, writers, press operators, media and related activities workers.

Most cultural industries are engaged in crafts (30.22%) followed by the visual arts (21.09%), the music industry (15.41%), media and communication (15.21%). The sector that is less represented is that of film and audiovisual production. Most companies operate as distribution or distribution houses for cultural products (42.39%) and, 34.09% are independent artists (musicians, writers, painters, etc.).

The Analysis Tool

Two types of dichotomous models are generally used: logit and probit. The choice of one to perform analyses is not an insignificant fact. Therefore, it is necessary to explain the choice of the model that is used in this article, and to expose its form before presenting its limits and coherence.

Explanation of the choice of analysis tool. For some authors (Morimune, 1979; Davidson and MacKinnon, 1984), there is virtually no difference between these two tools, and the problem of choice between these models is of little importance. According to these same authors, the use of logistics law is simply motivated by its simplicity. However, for others (Amemiya, 1981), one must be careful about the direct comparison of the two models[11], since the estimated values of the parameters are not directly comparable. This means that a normality test should be performed to ensure the model to be implemented.

[11] The variance of the logistics law is not the same as that of the normal.

However, in this study, it is not necessary to perform the normality test. Indeed, the economic and financial factors that have been captured from the intervals are similar to qualitative variables after codification. Normality tests are parametric tests of quantitative variables. Therefore, since we have no quantitative variables in our data, the choice of one of the models becomes free. Thus, the logit model is used here because of the simplicity.

The logit model. This model allows us to observe the probability of a phenomenon being realized. Here, we are talking about whether a cultural industry is performing or not, under the constraint of the variables of collaborative innovation and those of control (economic and financial factors, characteristics of the cultural actor). The latter is considered to perform if the respondent is indifferent to his annual gain or satisfied with his gain. This means that his gain has exceeded θ or reached a threshold he has set for himself. This difference is then explained by the previous variables whose vector notation is x_i written. If N is the number of industries in the sample and y_i is a coded variable relating to the event the gain of this operator has *exceeded the threshold* δ *or not*.

We have $\forall i \in [1,N]$ ask: $y_i = \begin{cases} 1 & if \quad gain_i \succ \delta \\ 0 & if \quad gain_i \leq \delta \end{cases}$, with

$$gain_i = x_i'\beta + \varepsilon_i \qquad (1)$$

Where β is the vector of the regression coefficients of the explanatory variables x_i. Disturbances ε_i are supposed to be independently distributed. For an industry, the variable associated with δ is a latent variable that is not initially unobservable. But we can see whether the industry is performing or not. In other words, the industry y_i performs well, if $gain_i \succ \delta$. If it is not, the industry does not perform. Logistic regression is

then based on the latent nature of the $gain_i^*$ variable. The resulting latent model is:

$$y_i = \begin{cases} 1 & if \quad gain_i^* \succ 0 \\ 0 & if \quad gain_i^* \leq 0 \end{cases} \tag{2}$$

with $gain_i^* =$ observed gain level - expected gain level,

$gain_i^* = x_i'\beta + \varepsilon_i$ is also a factor of explanatory variable x_i.

The probability that an industry from the base will observe that it is performing can therefore be written:

$$\Pr ob\left(y_i = 1 / x_i \right) = prob\left(gain_i^* \prec 0 / x_i \right) = prob\left(x_i'\beta + \varepsilon_i \prec 0 / x_i \right) \tag{3}$$

$$= \frac{\exp\left(gain_i^*\right)}{1-\exp\left(gain_i^*\right)} \qquad = \qquad \frac{\exp\left(x_i'\beta\right)}{1-\exp\left(x_i'\beta\right)}$$

Like any model, this one is not free of limits. However, it remains a very reliable model for analyzing the occurrence of certain economic phenomena such as achieving a performance target set by an industry or entrepreneurial failure.

Limitations and consistency of the logit model. Logistic regression is a binary classification model, simple to interpret but with a certain number of limitations: -the first limit is related to binary classes, i.e. the occurrence or not of the phenomenon studied. If these classes are not convex, logistic regression cannot model it (Craiu et al., 2011), -the second limit is related to the cumbersome calculations of marginal coefficients when the number of variables used is very high (Craiu, 2008), -The third limit is about the sample size. The logit model is unusable when the sample size is small (Berkson 1951, Dussaix, 1987). In this study we used enough cultural industries,

those of the IOF database. -It is impossible to use the quantitative variables selected for the analysis as they are. Normality tests for these variables must be carried out in advance (Aminot and Damon, 2002). If normality tests indicate that they are continuous variables, the probit model is indicated. Otherwise, the results obtained from the logit model will be inappropriate. This precaution was taken when choosing this model, because we only have qualitative variables after codification.

Beyond these limits, the logit model is consistent with the analysis we conducted. Three points of coherence can be stressed: -first, the quality of a logistic regression depends mainly on the choice of explanatory variables to be integrated into the model. It is therefore a matter of retaining appropriate variables for analysis. To this end, an in-depth literature review is required beforehand. Thus, the variables used in this article were chosen based on a literature review on the theory of collaborative innovation. -Second, the logistic regression model accurately estimates the strength of the relationship between a dichotomous (dependent) *qualitative* variable and independent variables that may be qualitative or quantitative (Desmet, 1993). This benefit ensures the likelihood of the results achieved in this work. -Third, a logistic regression model can be adjusted to the data we use. Indeed, if initially this model was used in epidemiology and marketing to address the modeling of a binary variable (number of successes for n trials), today it has re-entered the practice to quantify risk factors related to pathology, bankruptcy, etc. (Aminot and Damon, 2002). In this article, we quantify the probability of gain of cultural industries and the effects of the explanatory factors of this phenomenon. This is a phenomenon like business success in contrast to corporate bankruptcy. Hence the consistency of this model for this study. As the analysis tool is apprehended, the effects of collaborative innovation on artists' economic performance remain to be determined.

MEASURING THE EFFECTS OF COLLABORATIVE INNOVATION ON CULTURALS' INDUSTRIES EARNING FUCTION

Table 3 presents the estimation results of the effects of collaborative innovation on the economic performance of cultural industries using a logit model. This table shows the estimated regression coefficients of the logit model and their marginal effects. It shows that the probability of having an improved gain under the constraint of the explanatory factors selected amounts to 46.11%. These factors explain this low probability differently. In terms of collaborative innovation factors, they have a positive impact on the economic performance of cultural industries.

Indeed, on reading the marginal effects, the fact that cultural actors operate within production and creative cooperatives improves, significantly at the 1% threshold, their earning perception of about 12.15%. This means that collaboration within these cooperatives generates significant innovations and knowledge transfers. Similarly, the fact that an industry operates formally while affiliated with a PO significantly improves its level of gain by about 13.42%. This means that by being affiliated with POs, cultural industries benefit from copyright protection, training seminars; weave networks for distributing their products and even acquiring new technologies.

Similarly, industries that are affiliated with the CMS see their gain improved by 16.29%. These are co-operatives and formal industries affiliated with POs benefit from copyright. On contrary, a formal industry that does not collaborate with OPs sees its level of gain drop, significantly to the threshold of 1%, by about 10.61%.

The choice to exercise in the informal sector significantly improves the level of gain of cultural industries by 18.95%. This value is greater than the results of membership in an PO, cooperative or CMS.

This seems to explain why many industries (37.32%) prefer to practice in the informal sector. These must be industries whose actors work together to benefit from each other's know-how, and which refuse to formalize themselves because they do not want to pay taxes.

There are many cultural industries that do not receive subsidies (47.05%) and have a good perception of their gain. An industry randomly selected in the sample, which does not receive subsidies, observes at the end of the year an increase in its earnings of 37.66%. On the other hand, those who receive public subsidies see a reduction in earnings of about 37.79%. This could be explained by the fact that they find these grants are less important than the financial support from the patrons. Indeed, very few cultural actors (27.99%) are interested in the subsidies granted by the State. This result corroborates the one obtained by Silavong and Waelbroeck (2011). In a study on innovation, research and development in French cultural industries, these authors find that direct public subsidies do not have a positive effect on sales generated by new products. Nevertheless, they find that subsidies from local authorities substantially improve the percentage of sales made by new products.

In the same perspective, in our study, cultural industries that receive subsidies from patrons see an improvement in gain of about 27.17%. This means that the grants given by patrons are important and allow cultural actors to bring innovations to their products. This also allows them to pool their efforts by acquiring new production and distribution technologies. These patrons are usually media and communication companies, organizers of major festivals and large industrial groups. They support cultural actors knowing that their activities attract economic agents and households to the localities where they are located, the letter being consumers of the products they offer.

The State also invests in media and communication. It also creates infrastructures that cultural actors use for the festivals they organize. In

short, it creates an environment that is pleasant for the development of cultural activities. This underpins that the incentive framework it sets up encourages cultural actors to develop innovative industries through the interactions that take place between them and large companies. This result is achieved by LeCorf (2013). The latter showed that the cultural infrastructures that the State creates in its territories are a factor in the attractiveness of economic agents.

Table 3 Effects of Collaborative Innovation Decisions on the Cultural Industries' earning function

Variables		**Regression coefficients**	**Marginal effects**
Appreciation of gain			
Economic and financial	**Rate**		
	<15.000	0.5500 (6.09) ***	0.1363 (6.16) ***
	[15.000-40.000]	0.0016 (0.02)	0.0004 (0.02)
	≥ 40.000	-0.0996 (-1.00)	-0.0247 (-1.00)
	Investment		
	<10 million	0.7729 (7.47) ***	0.1902 (7.62) ***
	[10-20million]	-0.0155 (-0.17)	-0.0038 (-0.17)
	≥ 20 million	-0.2322 (-2.53) **	-0.0574 (-2.54) **
	Workers' compensation	0.6601 (7.30) ***	0.1629 (7.44) ***
	<1,5million	-0.6021 (-6.15) ***	-0.1473 (-6.31) ***
	[1.5-3million]	-0.3666 (-4.01) ***	-0.0905 (-4.05) ***
	≥ 3million		
	Number of workers		
	< 10	0.1591 (1.66) *	0.0395 (1.66) *
	[10-30]	0.3606 (3.78) ***	0.0896 (3.79) ***
	≥ 30	-0.1720 (-1.67)*	-0.0425 (-1.68) *
Individual features	**Employer's level of education**	0.4538 (5.10) ***	0.1124 (5.14) ***
	Primary	0.4526 (4.88) ***	0.1120 (4.92) ***
	Secondary	-0.4783 (-5.24) ***	-0.1177 (-5.32) ***
	Higher		
	Culture-related profile	-0.5306 (-5.65) ***	-0,1308 (-5.73) ***
	Sector		
	Music industry	-0.2013 (-2.26) **	-0.0499 (-2.27) **
	Edition and digital	-0.8178 (-8.11) ***	-0.2000 (-8.34) ***
	Cinema	-0.0568 (-0.59)	-0.0141 (-0.59)
	Visual and graphic	1.0453 (9.69) ***	0.2554 (10.17) ***
	arts	0.4740 (5.18) ***	0.1170 (5.24) ***

	Media and communication Craftsmanship	0.1528 (1.50)	0.0380 (1.50)
	Type of structure		
	Production house/editing	-0.6000 (-6.52) ***	-0.1473 (-6.65) ***
	Distribution house/broadcast/..	0.3496 (3.73) ***	0.0867 (3.75) ***
	Independent Artists (musician, writer...)	-0.0060 (-0.06)	-0.0015 (-0.06)
Collaborative Innovation Factors	**Types of hardware**		
	Modern (digital devices.)	0.3458 (4.03) ***	0.0858 (4.05) ***
	Classic (tom-tom, sickle…)	-1.1976 (-13.16) ***	-0.2860 (-14.10) ***
	Website	0.8053 (8.90) ***	0.1985 (9.12) ***
	Grant		
	Government (State)	-1.5983 (-15.38) ***	-0.3779 (-17.17) ***
	Patrons	1.1198 (11.35) ***	0.2727 (11.97) ***
	No subsidy	1.5960 (15.86) ***	0.3766 (17.62) ***
	Operation		
	Cooperative (CIG, EIG)	0.4904 (4.72) ***	0.1215 (4.77) ***
	Formal and member of an PO	0.5417 (5.99) ***	0.1342 (6.04) ***
	Formal, not a member of an PO	-0.4307 (-4.54) ***	-0.1061 (-4.60) ***
	Informal (no status)	0.7701 (8.32) ***	0.1895 (8.53) ***
	Member of the CMS	0.6589 (6,70) ***	0.1629 (6.80) ***
Log likelihood		-1944.3784	
Prob>chi2		0.0000	
Pseudo R^2		0.2664	
Probability of having a high gain			0.4611

*** means the computed statistic is significant at 1 per cent, ** at 5 per cent and * at 10 per cent
The statistics of the reduced centered normal variable, Z, are in brackets.
Source: Author based on data from the Cultural Profile Survey (IOF, 2011)

In addition, using modern production equipment improves earnings by 08.58%, while distributing these products through websites improves earnings by 19.85%. On the other hand, the use of conventional manufacturing

tools reduces the expected earnings levels by 28.60%. These results can be explained by the fact that access to modern production materials in the cultural sector is generally expensive. To this end, African cultural industries are cooperating to benefit from these technologies. This helps to improve their earnings.

Speaking of economic and financial factors, it must be noted that industries with investment levels above 10,000,000 CFAF have a poor appreciation of their earnings. Thus, having a level of investment between 10,000,000CFAF and 20,000,000CFAF reduces the perception of gain by 00.38% and a level of investment greater than 20,000,000CFAF reduces this perception by 5.74%. Industries that achieve these levels of investment set high prices because of their spending. They are also the ones who employ more workers and pay high wages. Indeed, the levels of these factors reduce the levels of gain by 02.47%, 17.2% and 09.05% respectively. On the other hand, industries that charge are low and set low prices and, invest less are satisfied with their gains. These are the majority of companies in the crafts industry (couturiers, sculptors, basket makers, etc.) and those that distribute cultural products in detail whose activities do not require heavy expenses. Thus, setting prices below 15,000FCFA increases the levels of gain by 13.63%. And low levels of wage and investment expenses increase earnings levels by 16.29% and 19.02% respectively.

Regarding individual characteristics, it should be noted that cultural actors who have attained a level of higher education have a poor perception of their gain. This level of education reflects a decrease in the level of gain of about 11.77%. Similarly, having a culturally-related academic profile reduces the perception of gain by 13.08%. These results underlie the number of players who set high prices for their products to cover expenses incurred during their training. Industries in the music, publishing and film sectors have a poor appreciation of their earnings. Indeed, intervening in these structures reduces the perception of gain by 04.99%, 20.00% and

01.41% respectively. These are sectors whose products are regularly counterfeited or hacked, inducing a shortfall for cultural actors. On the other hand, industries in the visual arts, media and crafts sectors received an improvement in their earnings of 25.54%, 11.70% and 03.80%, respectively. Industries that operate as a production or publishing house and artists (musicians, writers, etc.) also have a poor perception of their earnings. Exercising in these types of structures reduces the gains of 14.73% and 00.60% respectively. As for the distribution sector or distribution companies, they have a good appreciation of their gain, because the choice to exercise in this type of structure improves the perception of gain by 08.67%.

CONCLUSION

This article determines the impact of collaborative innovation on the earning function of cultural industries in Cameroon, a country in sub-Saharan Africa. A review of the literature on the concept of collaborative innovation and its place in the cultural industries has helped to mark the empirical evaluation of this work. This evaluation was made possible by the use of descriptive statistics and a housing model. This model provides a low probability of earnings perception of approximately 46.11%, mainly due to economic, financial and individual factors as well as to collaborative innovation factors. Thus, in all economic and financial factors, it is found that: -having a level of investment above 10,000,000CFAF reduces the perception of gain. About 72.41% of industries are in this situation. -Industries that prices are more than 40,000 CFAF, those that employ more than 30 people and those that pay high wages note a reduction of perception of gains of 02.47%, 04.25% and 09.05%, respectively. There are 33.46%, 63.89% and 31.03% of industries in these situations respectively. Regarding individual characteristics: -having a higher education level and a culturally-related academic profile reduces the level of gain by 11.77% and 13.08% respectively. There are

30.22% and 47.66% of actors respectively who are affected by this situation. -The industries in the music, publishing and film sectors note a reduction of perception of their gains of 04.99%, 20.00% and 01.41% respectively. -Exercising as a production or publishing house or as artists (musicians, writers, etc.) reduces the perception of gain by 14.73% and 00.60% respectively.

On the other hand, most factors of collaborative innovation improve this probability: -the fact that cultural actors operate within production and creative cooperatives improves their earning perception by about 12.15%. Similarly, the fact that an industry operates formally while affiliated with a knowledge and innovation delivery and innovation PO significantly improves its level of gain by about 13.42%. In the same perspective, industries that are affiliated with the CMS see their gain improved by 16.29%. On the contrary, a formal industry that does not collaborate with POs sees its level of gain fall by about 10.61%. Industries that receive subsidies from patrons see an improvement in their earnings of about 27.17%. This means that the subsidies they provide are important. This allows cultural actors to bring innovations to their products and pool their efforts by acquiring new production and distribution technologies. Sharing modern production equipment in cooperatives and POs improves earnings by 08.58%. Similarly, the spread of cultural products through websites increases the gains by 19.85%. However, the use of conventional manufacturing tools reduces earnings levels by 28.60%. Industries that receive government subsidies from the State see a significant reduction in their gain of 37.79% at the annual deadline. This means that the incentive framework implemented by the Cameroonian state does not promote the establishment of innovative industries.

As recommendations for public policy measures, it is suggested to African leaders to: -Make the cultural sector a political and economic priority, -Improve the operating framework of cultural industries by creating many collaborative spaces for innovation, -Substitute

Direct State subsidies for tax credits. These tax-exempt credits are an incentive for innovation in the cultural industries (conferring Silavong and Waelbroeck, 2011). This, moreover, could encourage the cultural industries to function formally, -Exempting the patrons from the payment of a part of the taxes to be paid to the State. This could encourage them to support more cultural actions. -Quickly and fully transfer public expertise in the development of support and development schemes for this sector to local authorities. Because they are close to the territories, they would make targeted and attractive cultural investments by cultural actors and other economic agents.

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