How to cite this article in bibliographies / References
J C Miguel de Bustos, J Izquierdo-Castillo (2019): "Who will control the media? The impact of GAFAM on the media industries in the digital economy". *Revista Latina de Comunicación Social*, 74, pp. 803 to 821.
http://www.revistalatinacs.org/074paper/1358/41en.html
DOI: 10.4185/RLCS-2019-1358en

Who will control the media? The impact of GAFAM on the media industries in the digital economy

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Abstract
Introduction. The media ecosystem is governed by a new economy where traditional media are losing their hegemonic position to technologic companies. Despite the growing presence of these companies in media products and services, there are few academic studies examining their transformation from a structural perspective. **Methods**. This article provides a complete analysis of the Internet giants Google, Amazon, Facebook, Apple and Microsoft (GAFAM), which allows us to assess their impact on the media. Based on the review of scientific literature, the specialised press and corporate and institutional reports, the article examines the increasing connection between GAFAM and media content, as well as their capacity to establish patterns that shape the future development of the cultural and creative industries in the digital economy. **Results**. The results confirm that GAFAM play a central role in the digital economy and identify the key concepts of development for the media industries operating within this ecosystem.

Keywords
Digital economy; Internet; ecosystem; media; GAFAM

Contents

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1. Introduction

The digital ecosystem is governed by a new economy, where media groups and, in general, cultural industries, are losing their dominant positions. The Internet technology giants -Google, Amazon, Facebook, Apple and Microsoft (GAFAM)- have a growing presence in the media industries. These companies compete for the attention of users, develop media products and services and attract most of the online advertising investment. This affects not only the traditional media, but also disruptive platforms such as Netflix and Spotify.

In relation to the media, the Internet was presented as a space for the liberalisation of the intermediation industry (Henning-Thurau et al., 2007), as it allows creators to take charge of the distribution process (Clemnos and Lang, 2003). However, the Internet was not only understood as a new form of distribution (Bocksteadt et al, 2006), but as a platform that enabled creative freedom that would enrich the media system and would empower the audience. Although these promises have been partially fulfilled, the Internet has also enabled the consolidation of new hegemonic industrial structures. Initial studies warned us of the risk of intensified concentration (Bockowski, 2004; Lawson-Borders, 2006; Albarran, 2010). The first hypotheses about the (dis)intermediation model for media content (Iordanova, 2012) have become a model based on (re)intermediation, with new consolidated agents in dominant positions, both inside and outside the media environment.

Inside the media industry, there are streaming platforms like Netflix, Spotify and Twitch that have become consolidated content producers, promoters and/or distributors. Outside the media industry, there are the big Internet companies, whose interest in the media has increased, as well as their content and data needs. The disruption caused by these new models on the media scenario has received great academic attention. There are many works focused on the media transformations, such as the evolution of some television networks into distribution platforms (Meiker and Young, 2008; Creeber and Hills, 2007; Caldwell, 2006), the experimentation of the press with monetisation formulas (Micó et al, 2009) and the restructuring of the music sector (Ribeiro da Cruz, 2016). There is also a proliferation of studies on disruptive audiovisual models (Jenner, 2014; Izquierdo-Castillo, 2015; Gómez-Uribe and Hunt, 2016). However, there are few works that examine the ties between technology companies (owners of countless assets, including social networks) and the media industry from a structural perspective. The media ecosystem is increasingly more complex and its links with large Internet groups effects all agents involved, including the audience. Communication develops in a global environment, but the Cultural and Creative Industries (CCI) face the challenge of balancing local development and seeking opportunities to access the interconnected ecosystem (Murciano and González, 2018). The CCI are sensitive to the socioeconomic and technological contexts (Verón-Lassa et al, 2017), which is exacerbated by a digital environment governed by the parameters of a new economy. Therefore, the growth of GAFAM towards media spaces threatens the possibilities of development and competitiveness of the CCI in the digital economy environment.

This article presents an overview of GAFAM in the context of the digital economy that governs the activity of Internet companies, including the media. The analysis of the characteristics of GAFAM allows us to examine their dynamics and strategies to determine their impact on the media industries. The study is motivated not only by the growing ties between GAFAM and media products and services, but also by their ability to establish patterns that mark the evolution of the cultural industries in the framework of the digital economy.

2. Objectives and methods

The main objective is to examine the impact of GAFAM on the media ecosystem. This includes analysing the complex structure of GAFAM based on the identification of their characteristics, similarities and differences as a whole; to study the media assets owned by GAFAM; and identify the possible effects of the activity of GAFAM on the development of the media. All this framed within the context of the digital economy.

With regards to the research design, this work is based on the case study of the five internet giants Google, Amazon, Facebook, Apple, and Microsoft (GAFAM), which involves the analysis of multiple documentary sources, including academic papers, corporate and institutional publications, sectoral reports, and the specialised press.

First of all, we studied the context of the digital economy, which governs the development of the activity of the companies that operate on the Internet. Subsequently, an exhaustive study was carried out on the parameters that condition the dynamics and strategies of GAFAM, to be able to locate them within the digital economy. Finally, we looked at the media activities of GAFAM to determine their impact on the cultural industries, in general, and on the media, in particular.

3. The digital economy and the GAFAM ecosystem

The digital economy is based on intangible products and services and operates on a global scale. Coyle (1998) says the digital economy is built on the value of data, network economies and the reproduction and expansion of new users at zero marginal cost. Barefoot et al (2018:6-7) define it in relation to the Internet and ICT, and identify its three areas: Infrastructure (network, devices, software, telecommunications, IoT and facilities); commercial transactions; and the digital media content (free and pay media, Big Data supported, etc.).

The marginal zero cost of distribution, Big Data, e-commerce and the digital media enhance the logic of globalisation, which goes beyond the globalisation that characterised traditional media groups. In this global scenario, GAFAM occupy dominant positions, not only in their markets of reference, but in the whole of the sectors diluted in this digital economy.

This group, which was originally composed by Google, Apple, Facebook and Amazon (here we add Microsoft), are also known as “the lords of the air” (Echevarría, 1999), “the masters of the digital economy” (Barefoot et al, 2018), “the gang of four” (Walton, 2012), “the four horsemen” (Zaryouni, 2015) or simply “the four” (Gallaway, 2017). The term “lords” is pertinent, for it refers to the feudal lords, who controlled everything; even work belonged to them. In addition to “lords of the air”, Echevarría (2003) uses the term “lords of the networks”, which refers to an elite of service providers, platforms, search engines and devices whose businesses is founded on the use of work of users, that is, the huge amount of data they generate in their daily life digital.

To study the position of GAFAM in the digital economy, we use the definition of the Bureau of Economics (Barefoot et al, 2018) and Evans’s studies on media and technology companies (2017). The great magnitude of the activities of GAFAM prevent us from creating an exhaustive table. In spite of this, Table 1 shows that GAFAM cover almost all of the activities of the digital economy.

Table 1. GAFAM'S products and services related to the digital economy

			Alphabet Inc.	Apple Inc.	Facebook Inc.	Amazon.com Inc.	Microsoft Corp.
Infrastructures	**Hardware**	**Mobile handset**	Pixel, Android One	iPhone	_	Fire	Lumia
		Tablets	Android Tablets,	iPad	_	Fire tablets	Surface
		Streaming device	Chromecast	Apple TV	_	Amazon Fire TV	Xbox
	Software	**Search**	Google Search	_	_	Amazon.com	Bing
		Browser	Google Chrome	Safari	_	_	Internet Explorer
		Mail	Gmail	iCloud email	_	_	Outlook
		Messaging	Google Allo, Google Hangouts	iMessage	Facebook Messenger, WhatsApp	_	MSN Messenger, Yammer, M Team
		Voice/video calling	Google Duo, Google Allo,	FaceTime	Facebook Messenger, WhatsApp	Echo Show, Alexa App, Amazon Chime	Skype, Office 365 Video, Microsoft Stream
		Maps	Google Maps, Google Earth,	Apple Maps	_	_	Bing Maps, StreetSide
		Operating systems	Android, ChromeOS	iOS, macOS	_	Amazon Fire OS	Windows
		Workplace collaboration & enterprise productivity software	G-Suite, Google+	iWork	Workplace	Amazon Work Docs, Amazon Chime	Office, Office365, Microsoft Teams
		Photo storage	Photos	iCloudPhoto	Photos	Prime Photos	OneDrive
	Telecom equipment		Cable Costa Oregon (China Mobile) Proyecto Loon	_	Marea USA-Asia	USA-Australia USA-Asia	Marea
	Structures (Data centres…)	**Cloud Storage and Cloud computing**	Drive, Google Cloud Platform	iCloud	Data centres	Amazon Drive, Amazon Web Services	OneDrive, SkyDrive, Microsoft Azure
	IoT. Self-guided cars, drones	**Autonomous vehicles**	Waymo, Android Auto	Apple Car	_	_	Software development programs underway
		Wearables	Android Wear, Google Watch	Apple Watch	_	_	Band
		Virtual reality/ augmented reality	Google Daydream, Tango, TiltBrush	ARKit	Oculus, Augmented reality tools		HoloLens, Mixed Reality
		Voice-activated/virtual assistant, chatbots, Smart speakers	Google Home, Google Assistant	Siri, HomePod,	M (2015), Messenger Bots (2016)	Echo/Alexa, Amazon Lex	Cortana, Bot Framework, Tay, Zo, Ruuh, etc.

		Artificial Intelligence	Deepmind, TensorFlow	Caffe	Facebook AI Research	Amazon AI	Microsoft Artificial Intelligence Program
e-commerce	**B2B**		Influencer	Apple Business Manager	Influencer	Amazon Business Amazon Web Services	Ooyala
	B2C	**App store**	Google Play	App Store	_	Amazon App Store	Windows Store
	P2P commerce	**Payments/ Wallets**	Android Pay, Google Wallet	Apple Pay, Apple Wallet	Facebook Payments	Amazon Pay, Amazon Wallet	Windows Wallet
Digital media	**Direct sales digital media**	**Shopping**	Google Shopping	iTunes Apple Music	_	Amazon.com	Microsoft Store
	Free digital media	**Social networking**	Google+	_	Facebook, Instagram	Goodreads(books)	LinkedIn (2016)
		Video aggregation /Live video	YouTube, YouTube Live	Clips (video editing for posting on other platforms)	Live (2015), Videos, 360 Videos	Amazon Prime Video	Microsoft Stream
		Entertainment: music, movies, eBooks, games	Google Play Stream Project	iTunes	Games	Amazon Music Kindle Twitch	Windows Store Project xCloud
		Online advertising	AdWords, AdSense Analytics, Admob, DoubleClick, AdExchange Tag Manager	iAd	In NewsFeed Audience Network	Amazon Advertising	Bing Ads, Bing Network
		Local directory	Google	Apple Maps	Places, Pages	_	Bing Places for Business
		News	Google News, Google AMP	Apple News	NewsFeed, Instant Articles	_	Linked-In
	Big data	**Number of users/accounts**	40.000 searches/ second 1.000 M of hours /day (YouTube)	588 M credit cards accounts 1.300 M of iPhones	2.200 M of monthly active users 1.200 M of Messengers users	100 M of Prime Amazon users	1.200 M of Windows users

Sources: Authors' own creation based on multiple sources (Barefoot et al, 2018; Evans, 2017; Wall Street Journal; and brandwatch.com)

In addition to the development of products and services, the connections with these activities can also occur indirectly. For example, Google and Facebook have a great influence on the B2B process, although they do not develop specific activity in this area. The table also allows us to observe that, in relation to digital media, GAFAM have a powerful reach, which we will see in detail later in the analysis.

At this point, despite having its origin in differentiated sectors and businesses, GAFAM have formed superstructures around the digital economy. They are ecosystems because they conceptually transcend the industries and activity sectors (Moore, 1996). They act on different economic and productive fields, through multiple and varied products and services. Each member of the GAFAM group can be considered an ecosystem in itself, a component of a digital system, since they perform activities belonging to different industry sectors, and involve millions of users (Miguel and Casado, 2016). One of these areas is the media, which is incorporated into their ecosystem under the conditions of the digital economy. To assess their scope in this scenario, we will analyse first the main characteristics of GAFAM as a whole.

4. Characterisation of GAFAM

Each one of the Internet giants creates its own ecosystem, so that, despite having a different origin, all of them create similar structures. Below we observe their main characteristics.

a) They compete in an ecosystemic way and not by product.

   Each one of the Internet giants has a different origin, with different models, but their expansion has generated interconnections in other industries, which makes them economic ecosystems. The apparently disparate activities engage in a symbiotic relationship that traps consumers within each proposed universe. Thus, an iPhone user understands the advantages of immersing themselves in the Apple universe, through applications, content, and cloud storage. At the same time, this universe forces you to update your devices and acquire other complementary devices, in a spiral of infinite consumption and recycling. Similarly, Amazon offers the Prime Video service as an incentive to create Premium accounts for its primary online trading service, after it was confirmed it stimulates purchases and increases spending per user.

   Whether they sell devices or software, content or applications, GAFAM markets the ecosystem as a whole. The entry and exit of these ecosystems involve costs that transcend the cost of the first purchase (Borrow, 2014), since it stores personal information and acquired products (photographs, videos, documents, music, Apps, passwords, applications, etc.).

   These ecosystems tend to be quasi-closed and incompatible between them, although not always mutually exclusive. For example, Android OS (Google) and iOS (Apple) are incompatible, but both support YouTube, unlike Amazon's Echo virtual system. Similarly, Apple TV does play Amazon Prime Video, but does not support Spotify. This game of restrictions and compatibilities is constant, the result of negotiations between the tech giants.

   Therefore, competition is performed jointly at all levels, not by scope or product. In fact, the tech giants face little competition in their main market but face significant competition as ecosystems. For example, Google competes with Facebook for advertising, but not in search engines or social networks. And they all compete in the areas of expansion: Artificial intelligence, audiovisual content and cloud storage. These new markets (Coyle, 2018) are the area of growth and survival of GAFAM.

b) They are very centralised groups with a marked expansive growth. Like the media groups have grown exponentially over the decades (Miguel de Bustos, 2016), GAFAM also experience continued expansive growth. This expansion is enabled by innovation and the acquisition of other

companies or specific agreements with companies of major relevance. This need imposes great strain and forces GAFAM to continually search for new technologies and markets where to apply them.

At the same time, this expansive character entails a process of centralisation. GAFAM compete to dominate the most innovative business areas: Big Data, the cloud, media contents and the Internet of Things (IoT). The ultimate objective is to dominate The Next Internet (Mosco, 2018): "Is already highly concentrated and is dominated by American firms. Indeed, on August 2016, the top five Next Internet companies became the world's leaders in market value". These five companies are GAFAM.

The continuous growth (new services and geographical expansion) becomes a barrier of entry for new companies. The Organisation for Economic Co-operation and Development (OECD, 1998:20-21) points out that small businesses have it easy to enter new markets, but the reality is different. In fact, there are many vectors that can help to create and enter a market (using Big Data, globalisation, access to consumers with special preferences, non-capital-intensive companies, platforms' advantages, etc...), but these same vectors can be, and in fact are, used by GAFAM. So, in case any startup manages to get in it will be absorbed or copied.

Table 2. Financials of GAFAM in 2017

	Google	Apple	Facebook	Amazon	Microsoft
Stock market value (M$)	685,730	810,000	443,700	483,000	559,000
Sales (M$)	90,272	216,000	28,000	136,000	85,320
Origin of sales	Advertising 88% Others 21%	iPhone 61% Services 9% Others 7% iPad 7% Mac10%	Advertising 93% Other 7%	Products 72% Media 18% Cloud 9% Other 1%	Windows 9% Office 28% Server/Azure 22% Xbox 11% Advertising 7% Others 23 %
Revenue from outside the USA	57%	70%	54%	38%	54%
Employees	72,000	116,000	18,770	341,000	114,000
Investment in R&D (M$)	16,680	11,680	7,880	22,680	12,380
Market value/ sales	7.60	3.75	15.80	3.55	6.55
Revenue/ employee (M$)	1.25	1.86	1.49	0.39	0.75
Gross income	21%	21%	36%	22%	20%

Sources: Authors' own creation based on MarketWatch, Financial Times, Bloomberg Molla (2018) and Form 10-K.

c) Leaders in stock market capitalisation

GAFAM are leaders in their main market and in the stock market. The dominance of Google in search engines and of Amazon in online sales is indisputable. However, their respective models are very different. Google and Facebook compete directly for the advertising market, which represents 90% and 71% of their income, respectively. Apple and Amazon do not depend on advertising inserts, but on the sale of products. Table 2 shows the difference between GAFAM, according to the revenue/employee and market-value/sales rations. According to the latter ratio, the highest values correspond to Google and Facebook, which are precisely the companies that base their revenues on advertising. On the other hand, Apple has the highest revenue/employee ratio, followed by Google and Facebook. This is a consequence of the "scale without mass" (OECD, 2018:19), which refers to the disconnection between the company's size (measured in term of employees, for example) and sales, which is a phenomenon that occurs in digital companies.

The size of GAFAM and their position in the digital economy give them a great market capitalisation. This value is based on potential magnitudes rather than on market behaviour. This explains the fact that Facebook has a market capitalisation similar to Amazon, with a sales volume 7 times lower. Over the past decade, GAFAM have gained a place in the top five USA firms, so they represent the current capitalism focused on the economy of the network (table 3).

Table 3. Top five American corporations based on market capitalisation

Ranking	1990	2000	2010	2017
1	IBM Corp.	General Electric Corp.	Exxon Mobil Corp.	Apple Inc.
2	Exxon Mobil Corp.	Exxon Mobil Corp.	Apple Inc.	Alphabet Inc.
3	General Electric Co.	Cisco Systems	Microsoft Corp.	Microsoft Corp.
4	Bristol-Myers Squibb Co.	Wal-Mart Stores Inc.	Berkshire Hathaway Inc.	Amazon.com Inc.
5	Merck & Co.	Microsoft Corp.	General Electric Co.	Facebook Inc.

Source: Authors' own creation based on data of Evans (2017) and Mosco (2018)

However, the question that arises is for how long will GAFAM keep this high capitalisation, which is the result of investors' confidence in their potential for growth and profit. In 2018 there were some signs of wear, such as the accumulation of problems on Facebook (Mac, 2018), the huge drop in Apple's capitalization (from $1.12 trillion to 0.675 trillion) (Kanter, 2019). This could result in a decrease in the value of the shares, which would lead some of the tech giants to reconsider their strategies.

d) They depend on innovation. Unhealthy hunger for patents.

Except for Facebook, the tech giants are in the top five American companies with the largest R&D investment. Amazon stands out with 22.6 trillion dollars, followed by Alphabet with 16.6, Microsoft with 12.3 and Apple with 11,6. Innovation is carried out directly (internal areas) or indirectly (start-ups and talents).

The acquisition of start-ups is a key strategy for GAFAM. In this way they acquire innovation and entrepreneurship (Miguel and Casado, 2016), but also avoid the growth of future competitors. At the same time, ideas are easily replicated, so sometimes GAFAM incorporate non-acquired services in their activities. This is the case of Facebook, which incorporated "stories" after Snapchat did not agree to be bought (Gross, 2017).

Part of the innovation focuses on patents: in the 2009-2017 period, Microsoft stood out in patent registration with 16,480, closely followed by Google (14,596). The areas of innovation are diverse, ranging from hardware development to behavioural analysis, cloud research and mobile innovation. Particularly noteworthy are the areas of cyber security (2,620 patents), virtual and augmented reality (2,000) and artificial intelligence (700 patents). The latter has multiple applications, especially in driverless cars (where Google has 500 patents), robots, drones and home assistants (like Alexa). Another area is image analysis with facial recognition, which can be used for the smartphone. Recommendation systems would also fall into this category (Table 4).

Table 4. Number and type of patents registered by GAFAM in the 2009-2017 period

	AI	Cyber-security	Unmanned vehicles	VR/AR	Health	Total*
Google	300	650	500	400	42	14,596
Amazon	>70	450	150	250	Some	5,186
Facebook	>70	90	10	600	Some	2,508
Apple	<30	530	70	250	40	13,420
Microsoft	270	900	<70	600	120	16,840

Source: Authors' own creation based on data of CBInsights (2017) *There are multiple organisations that collect, annually, the number of patents registered by American company. See for example: www.ipo.org/wp-content/uploads/2017/05/2016_Top-300-Patent-Owners.pdf.

In short, the goal of this innovation is to offer users advantages for their personal and professional routine. Ultimately, however, they are databases for the exploitation of Big Data. In this sense, the areas of health and IoT stand out, as shown below.

e) Internet of Things (IoT) and health as vectors of strategic growth

In recent years, GAFAM focus their innovation investments in technology linked to the areas of health and the Internet of Things.

One of the objectives is to link their use to the smartphone. Amazon and Apple have patented heart disease smartphone detection. In the same way, Google works with optical sensors to Interact with smartphones and detect changes related to cardiovascular diseases. In addition, Alphabet has three subsidiary companies dedicated to health (Calico, Verily and Deep Mind) and over 40 applications related to health.

The Internet of Things is the other great area of innovation. The fight for leadership in this area is overwhelming, not only due to the competition but also due to the proposed applications and their effects on digital societies. The use of drones, unmanned vehicles and smart cities stands out. The strategy of GAFAM is expansive, in order to facilitate technology and generalise its use. This is the case of Android Things and Nest Labs (Google); HomeKit (Apple); Dash Button, Echo and Wink Hub (Amazon); and Facebook's projects to manage different devices from the social network accounts.

In the field of artificial intelligence, Apple dominates with its number of patents in Virtual Reality and Augmented Reality. The main application focuses on autonomous cars, where Google is the leader. On the other hand, Microsoft works on the patent of head sensors for mind and apps interaction (CBInsights, 2018). For its part, Amazon is one of the most interested companies in the development of drones, insofar as they can become part of the distribution logistics.

It should be noted that the consolidation of technologies and their most diverse applications in the personal and professional lives of users poses the challenge of protecting sensitive data. This motivates GAFAM to invest in cybersecurity.

f) For Now, scarce control of telecommunication networks.

Telecommunication networks are the current challenge of GAFAM. Their technological nature makes them fully dependent on these infrastructures. In recent years, these groups have intensified their activity in the area, despite the strong position of Telecom operators. GAFAM look for global connectivity, mainly through underwater wiring projects. This is the case of Google and China Mobile, which undertook an initiative to wire the coast of Oregon (USA) with Chie and Mie (Japan) in 2014. In 2016, Microsoft and Facebook launched their tide project to connect the United States with southern Europe, although the network will be operated by Telxius (Telefónica). At the same time, Amazon invested in networks that connect the United States with Australia and in 2017 partnered with Facebook to build a submarine wire between Asia and North America (Lucas, 2018). As an alternative to wiring, Google develops the Project Loon, to connect areas of difficult access to the Interne with high-altitude helium balloons.

g) Big Data at the core of the DNA of GAFAM.

As mentioned, GAFAM adopt different models (Tables 1 and 2). However, it is possible to identify a common element in the exploitation of their respective ecosystems: the competition for users' attention. In Short, the essence of GAFAM resides in the search, compilation and management of Big Data. The set of products and services they offer seek to obtain as much user information as possible, for the purposes of internal and/or external exploitation.

External commodification of data is directly linked to Google and Facebook revenue models. Insofar as they depend on advertising, this groups devote great resources to study and classify their users. In this sense, they are vulnerable to the growing concern among Internet users about the data they share online, which can be an opportunity for their competitors. For example, the hypothetical launch of a search engine that guarantees user data privacy by a company that does not depend on advertising, like Amazon. For the same reason, the business model of Apple, Microsoft, and Amazon presents a lower risk, as 95% of their revenue comes from the sale of their products.

The rest of GAFAM also exploit user data, although for their own benefit. Apple uses differential privacy technology to obtain data, but without linking it to people (Bershidsky, 2018). The objective is to know information about location, use, battery, acquired content, etc. In general, the main source of data for companies like Google and Apple is the mobile phone, but also the set of applications developed for the IoT, health or artificial intelligence. In the case of Microsoft, which has a limited presence in the smartphone, it collects information mainly from the cloud.

In any case, privacy acquires a double value. On the one hand, it is an added value to services and, on the other, it becomes a throwing weapon in the competition between ecosystems. Privacy is a right of citizens, not a "tradable commodity" (Mosco, 2018). Violation of this right can be detrimental to GAFAM. One example is Facebook's shares plunge on 26 July 2018, a total of 137 billion dollars (19%), as a result of the crisis caused by Cambridge Analytica breach scandal (Solís, 2018a).

5. GAFAM and the Media

GAFAM are acquiring an ever-increasing presence in media services (Table 1). To the traditional music, video, books and news sectors, they have added novelties in videogames and competition for sporting rights.

The launch of iTunes in 2001 and the Music Store in 2003 was the first digital disruption. Apple allowed the purchase of individual songs, eliminating the requirement of album compilation. Later, the consolidation of the of the streaming music model of Spotify would force GAFAM to launch their own music platforms. This is the case of Apple Music and Google Play Music, which have 40 and 35 million songs in their catalogues, respectively. In terms of users, the Apple service stands out with 45 million (Resnikoff, 2018), although it is still far behind Spotify's 170 million active users (Castillo, 2018). Despite this, GAFAM are trying to find their niche in the market. Amazon Prime Music only has 2 million songs, while Microsoft ended up closing Groove Music (2015-2017), the streaming platform that replaced Xbox Music. A different proposal is the one made by Facebook, which experiments with *Lip Sync Live*, a feature that allows users to lip synch songs live. This implies the management of contracts with producers to host the music catalogue of the videos (Wang, 2018).

In the publishing sector, Amazon and Google stand out as major competing groups. Through Google Books (2005), the company intended to create the largest virtual library, facing the opposition of the industry and authors (Vercelli et al, 2016). At the same time, Amazon channelled the sale of digital books through the Kindle device (2007).

However, the concern for the relationship between GAFAM and news dissemination is increasing. Through aggregation services such as Google News (2002) and Facebook Instant Articles (2015), GAFAM act as intermediaries in the dissemination of news. This phenomenon is closely linked to the problem of fake news and the new forms of information consumption (Regina, 2012). In this sense, Facebook increased its influence in the distribution of news with the acquisition of Twitter in 2017.

Moreover, Apple has a strategy that is more linked to access to news and information. Its closed circuit of devices and services feeds on content providers, of which news is one the most important. In 2011, the company bought Newsstand (later transformed in Apple News), to access newspapers and magazines. It also bought BookLamp (2014), which analyses Big Data from books to develop a

recommendation system (Michán, 2014), as well as the magazine editor Prss. In 2018, the company bought Texture (Lunden, 2018), a platform with 200 magazines, whose access costs 9.99 dollars per month.

At the same time, in recent years, the presence of GAFAM stands out in a remarkable way in video services. First of all, Apple added video sales to iTunes in 2005, and soon after Google bought YouTube. None posed a threat to the traditional model, until Netflix appeared. The consolidation of this platform led GAFAM to make an incursion into this sector. Amazon was the first one to consolidate an equivalent option, with Amazon Prime Video. This platform became operational in 2006 and currently invests 5 trillion dollars in its own production (Weprin, 2018). For its part, Apple is planning to invest a trillion dollars to produce 12 series (Horwitz, 2018) and aims to launch its own video streaming platform (Toonkel, 2018). GAFAM, however, are still far from Netflix's budget of more than 12 trillion for content creation and purchase (Feldman, 2018).

Facebook and Microsoft are in the background. In 2017, Facebook launched Watch, VoD platform with a very limited catalogue. For its part, Microsoft focuses on the professional field, with Microsoft Stream (2015) directed to business video.

Table 5. Media assets owned by GAFAM

	MUSIC	VIDEO	NEWS	VIDEOGAMES	SPORTS	BOOKS
GOOGLE	Google Play Music	YouTube	-	YouTube Gaming Stream Project	IPL (YouTube) Major League Soccer	Google Books
APPLE	iTunes Music Store Apple Music	iTunes Streaming Platform (pending)	Newsstand/ Apple News BookLamp Prss Texture	-		Kindle
FACEBOOK	Lip Sync Live	Watch	Facebook Instant Articles Twitter	Instant Games Gameroom Gaming	UEFA Champions L. Mexican Football L. WWE Major League Baseball Wednesdays	-
AMAZON	Amazon Prime Music	Amazon Prime Video	-	Twitch	NFL Thursday Nights (2017-2018)	-
MICROSOFT	Xbox Music/Groove Music	Microsoft Stream	-	Project xCloud	-	-

Source: Authors' own creation

In the videogame industry, however, both Facebook and Microsoft have a relevant position. The first follows a strategy combined with different services, to monetise its portfolio of 800 million potential players (Alvarez, 2018). Games are part of the experience of the users of Facebook, which even encourages the creation of this type of content, through Instant Games, and has also offered Gameroom (2016), a videogame platform. However, Amazon leads the market of live videogame streaming platforms, since 2014 when it bought Twitch, with 15 million daily users. For its part, YouTube (Google) tried to channel the creation and consumption of game content through a special section called Gaming, but it was closed after users preferred the main portal. Google's main videogame project focuses on the streaming experience. This is the main trend where the rest of the tech giants

seek to position themselves. Google does it with Stream Project, Microsoft with Project xCloud, and Facebook with Gaming.

Apple's position is different. The company does not have any assets in video games. However, 82% of the income of its App Store comes from this type of content (Browne, 2018).

In general, GAFAM worry about the presence of entertainment in the audiovisual sectors. Despite not coming directly from any cultural industry, GAFAM have in common their presence on platforms offering video, music, books and, especially, video games. It should be noted that none of them surpasses the industry leader in the field of online video, Netflix, nor in the field of music streaming, Spotify.

This motivates GAFAM to bet on other types of contents that allow them to complement the offer and lead in the field of entertainment. Sports content attract large audiences and facilitate the expansion of the platform that acquires them (Kaltura, 2017). For this reason, sports contents have become one of the current and future axes for the development of these companies (Andriole, 2018). GAFAM invest large budgets for the acquisition of sporting rights. Amazon intended to pay 20 trillion dollars for Disney's 22 regional television networks (Sharma, 2018) to make Prime Video more attractive. For this reason, it acquired the rights of the NFL Thursdays Night for the 2017 season, which is worth 50 million dollars, five times more than what Twitter paid the previous season (Rovell, 2018). The next season seemed to be disputed between Twitter, Amazon and YouTube, although it was finally awarded to Fox. In the case of Apple, its main motivation is to build a powerful content offer (Booton, 2018). Facebook has also started its bet on this catalogue (Ourand and Smith, 2018), just like Apple (Lynley, 2017). On the other hand, Google bought the rights for the IPL (Indian Premier League) to increase advertising revenues on YouTube.

Although the amounts paid by GAFAM are not as high as the ones paid by traditional media, they will increase as soon as they start to get scarce. Facebook now has the Major League Baseball Wednesdays in the afternoon (Atkinson, 2018) and previously had the rights to the UEFA Champions League with Fox and the Mexican Football League with Univision. In addition, once a week it broadcasts a WWE wrestling event. On the other hand, YouTube incorporates the rights of the Major League Soccer, which includes the streaming of the Seattle Sounders Soccer Club, although the agreement with Los Angeles FC is even more complete, with exclusive broadcast rights (Atkinson, 2018).

This way, although GAFAM are not the leaders in central markets like video or music, their ecosystem strategy allows them to engulf these sectors, transcending the most sectorial models of Netflix and Spotify. GAFAM exercise on the media the pressure of this ecosystemic competition, achieved through many acquisitions. Here, we see that GAFAM maintain the acquisitions within the digital sphere. They purchase start-ups and consolidated companies, but always linked directly to the digital economy. At the moment, mergers are not made with the traditional media groups.

For this reason, it is inevitable to wonder about the possible adoption of integration strategies on the part of GAFAM to eliminate media competition and control the market. In this sense, Netflix would be very attractive to be acquired by some of these companies. However, under the parameters of the digital economy, the platform has a strikingly high market capitalisation, 13.5 times higher than its real income value (Solis, 2018b). On the other hand, GAFAM seem more interested in generating their own audiovisual content than in acquiring major and consolidated platforms, at least for now.

6. Conclusions

The analysis has shown that GAFAM meet the necessary conditions to be considered the leaders of the current economy, which is also characterised as the second economy (Arthur, 2011) or surveillance capitalism (Zuboff, 2016). This situation conditions the rest of the industries linked in a competitive way with them, such as the cultural industries.

The presence of GAFAM in the media field hinders the development of traditional agents. Media groups intensify their growth and expansion dynamics to cope with the growing presence of GAFAM in their respective sectors. For example, in 2018, Disney acquired 21st Century Fox while AT&T acquired Time Warner. Their business growth is incessant and entails greater centralisation than that which has characterised large globalised companies. However, the growth of GAFAM has no limits in any activities that generate large amounts of data. That is their real value. The collection of Big Data, the attraction of users to their ecosystems and the accumulation of platforms is what makes them the gatekeepers of the media system (Meier and Manzerolle, 2018).

We have also observed that the growth of GAFAM, accompanied by innovation, is also a necessity. Achieving success first in an application can involve the recruitment of users in a micro-universe that derives from a greater universe, but the competition will quickly offer an alternative service, perhaps in better conditions. This also occurs in the cultural industries, where in the same way that only a Facebook can succeed, there can be only be one videogame streaming platform.

It is clear that, through innovation, GAFAM generate large entry barriers into the macro-ecosystem they form. Still, disruptive media platforms remain the leaders of their respective sectors, where GAFAM face resistance. In this sense, Netflix is now the unquestionable leader in video on demand, although Amazon Prime Video and new actors such as Disney and HBO are clearly trying to overcome it. In the same line, Spotify maintains a strong position in music streaming, despite the competition from Google, Amazon and Apple. However, we must consider that to the extent that GAFAM integrate the creative and cultural areas into their ecosystems, the ability of external agents to compete is weakened. Even in the assumption that an external company consolidates its position in one of the sectors, GAFAM will seek to acquire it or, when acquisition is not possible, to compete directly to oust it.

However, despite their hegemony, we must also consider the fact that GAFAM are subjected to a high fragility, as the results suggest. Their outstanding position in the stock market keeps them under constant scrutiny and may be affected by any business movement or decision. The demands are high and can only be met by those corporations that manage to maintain the self-imposed high levels of growth in the areas of innovation and leadership and overcome the problems of privacy and security that derive from their behaviour and threaten their hegemony. Indeed, even if they succeeded in resolving the important challenges posed to them, it is unlikely GAFAM will maintain their hegemonic position, in terms of stability, considering the growing presence that similar companies are acquiring in Asia (Jian, 2013). At least it is important to consider the question that one day they will disappear, because it would allow us to determine the new axes of development of the new competitors. One of the axes is blockchain technology, which enables the elimination of intermediaries.

In short, within the media ecosystem, we see that the scope of GAFAM is broad and heterogeneous and is constantly growing. The media are a central growth vector for these companies, so the characteristics of GAFAM apply to the creative industries. This can pose problems of competition. In the cultural industries, values such as diversity and pluralism must predominate. These values can easily and

simply collide with the conditions of development of GAFAM. Because of this, the analysis of GAFAM in relation to the CCI is necessary at both levels. From the economic point of view, GAFAM share special features that allow them to be considered jointly. From the perspective of content, the analysis should focus on the impact of their development on the CCI and the values that have been at the foundation of Western societies. So far, there were national mechanisms that could guarantee such values (e.g., public media), but these policies weaken in a digital and global environment.

In this sense, this work involves a first step needed to locate technology companies in the CCI. The results of this research not only allow us to know the positioning of GAFAM in the media ecosystem, but also to observe what are the growth and competitiveness dynamics that take place in an ecosystemic environment. To the extent that the CCI are part of the digital economy, it is essential to identify the characteristics and dynamics that GAFAM establish as leaders of this economy to know the axes of growth and development for these industries.

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How to cite this article in bibliographies / References

J C Miguel de Bustos, J Izquierdo-Castillo (2019): "Who will control the media? The impact of GAFAM on the media industries in the digital economy". *Revista Latina de Comunicación Social*, 74, pp. 803 to 821.
http://www.revistalatinacs.org/074paper/1358/41en.html
DOI: 10.4185/RLCS-2019-1358en

Paper received on 18 January. Acepted on 12 April.
Published on 26 April.