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## The Image in Motion: Apple, Google and Contemporary Television

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## Abstract

In order to understand the traits of the contemporary reorganization of television, this article focuses on one aspect of the preparation of diffusion systems, oriented towards the association between smart TVs, smartphones/tablets, and apps. It draws attention to events in which information technologies become central to audiovisual aspects. It observes the opportunity to access content not through segmented cable-satellite channels, but rather by diverse producers, bypassing conventional stations to diffuse material via apps. The article focuses on the companies Apple and Google, interpreting their involvement as evidence of the transition to the logic of control and modulation. It analyzes the introduction of the format by Apple, through the iPod/iPhone and iTunes. The article also focuses on the expansion of this logic, paying attention to Google and the creation of software for operation in multiple devices.

### Keywords

Television studies; Media archaeology; Information and communication technologies; Control.

# 1. Introduction

The scene consists of a young man watching a TV series produced by the channel HBO TV on a Sony smart TV. The images arrive at his home not via the channel, but via the HBO Go app. The service relies on high-speed Internet connection, provided by Verizon. The young man operates the material – he picks a title, selects episodes, and looks for similar productions – not with a remote control but with a Samsung tablet. The Android operating system, which allows the application to operate, was provided by Google. Yesterday, the young man had seen part of the same content on his iPhone and, due to the software features involved, his TV set, telephone and tablet are fully synchronized. These mechanisms know exactly the point at which he had stopped, just as they know the last scene he watched the moment he switched off the TV set. With some modifications, this scene could be possible in Brazil. Perhaps Netflix was the streaming service used, with Internet connection provided by Telefónica. The content may perhaps be transferred via Globoplay. Variations do not change the theme at hand.

Broadcast and segmented television have been rendered obsolete, although they have not ceased to exist. Open networks and cable/satellite channels are still around and should remain so for the coming years.

While it is still part of everyday life, linear flow is impossible to assert itself as the only option for audiovisual content. Alongside it, a number of alternatives arise. In the very near future, varied streaming services are noted (Netflix, Net Now, Hulu, Vivo Play, HBO Go, and others), which are more effectively diffused thanks to broadband connections with greater traffic capacity. The best example includes fiber optics, which is capable of delivering high-speed Internet connection and, subsequently, ultra-high-definition (4K) content. This content relies on software and is far from the reality of conventional television,. The adoption of this software, which may be considered a minor detail of this technique, facilitates, however, systematic transformations on different levels.

Cable and satellite television depended on operators whose origins recaptured the cultural industry, as it was known in the past. They were well-established players in information or entertainment activities in search of diversification, such as Globo and Abril in Brazil, and News and Time Warner in the U.S. In our country, they gradually lost ground to telecommunications operators, in particular Telmex and Telefónica. Suddenly, a significant fraction of the cultural industry became the property of those who had thus far no relation to the cultural industry itself. From then on, content would be obtained through negotiations with

producers, some of them part of giant well-known enterprises – such as Sony, NBC Universal, and Disney – or more particular operations such as Televisa, Antena 3, and others (Holt, 2011; Lotz, 2007; Parsons, 2008) as well as other methods. The example of Netflix is certainly affirmed as the best-known case.

Unlike conventional broadcasting, cable-satellite operations used software without the radical implications related to streaming. The triad of smart TVs, smartphones/tablets and apps introduces complexities with the potential to transform the preceding paradigm. The transmission of content from information technologies approximates the audiovisual content from the logic that guides other contemporary activities: control and modulation (Deleuze, 1990). Television based on Information Technology involves the association of very diverse resources: connected TVs; applications for streaming services or virtual content stores; mobile computing; wireless networks such as 3G/4G or Wi-Fi; fiber optics or hybrid fiber-coaxial (HFC) infrastructures, among others. When circulating through these devices, the content depends on the flexibility that seeks to prevent its retention at any point, and the transparency to ensure the illusion of the absence of barriers. Its implications are perceived only when considering the material dimension of information technologies.

Among those involved, two companies affirm their contemporary importance: Google and Apple. Until 2001, they lacked contact with the cultural industry. Today, their space in it is essential. Learning about the dependence on programming and the relevance of software requires attention to the debate on the concept of protocol (Galloway, 2004). Media archaeology (Huhtamo; Parikka, 2011; Parikka, 2012) identified protocol as a set of characteristics that are in line with the definition of contemporary logic for power. Organized not by discipline, but by control (Deleuze, 1986; Foucault, 1975), the possibilities contained in this power structure involve management through flexibility. As opposed to the rigidity of broadcasting (with specific modes of diffusion, undifferentiated audiovisual content, and rigid routines imposed on viewers), the circumstances from which softwares introduced by Google and Apple operate are based on the multiple possibilities for the diffusion of content, segmentation of the material, and flexibility of consumer practices.

Understanding this scenario involves observing features identified as Android TV and Google TV, produced by Google, as well as specific devices such as Chromecast. Similarly, it implies the relationship they maintain with iPods, iPhones and iPads, introduced by Apple, defining a trajectory for the distribution of content in connection with certain online services. Based on the techniques presented by Google and Apple (among other lesser developments), it becomes feasible to

operate both streaming distribution services and connected TVs. The connection between smartphones/tablets content broadcast applications and smart TVs indicates a flexible relationship with audiovisual content, distinct from that observed in conventional or segmented television.

The discussion here is not about content. In the discussion relating to content, works such as those by Lopes and Gómez (2015) studied fiction in a geographic space composed of 12 Ibero-American countries. They addressed the nature of the genres, processes of reception, and organization of communication policies among others. In contrast to this diversity of subjects, this article draws attention to a particular problem. The article focuses on the material aspect of the objects from which contemporary possibilities for the apprehension of audiovisual formats are constituted. It concentrates on the mechanisms from which the diffusion of content becomes possible, and the expectation of apprehending traits that tend to become essential for the ongoing reorganization of television. As the main focus of the analysis, it approaches the techniques aimed at providing the software infrastructure that is crucial to the scenario as a whole.

In order to do this, the text is divided as follows. The first section will discuss the characteristics of software, and the expectation of relating them to audiovisual formats. It pays particular attention to the idea of power, with an emphasis on the discussion of control and modulation. This empirical discussion seeks to understand the terms in which certain fundamental mechanisms are established to allow this transparent and continuous flow of audiovisual content. This debate, conducted in the second and third sections, will discuss events in which Google and Apple get involved. In a description aimed at apprehending its historical dimension, we expect to understand how iPod, iTunes, iPhone, Google TV, Chromecast and Android TV take part in this process. The conclusion advances the debate in terms of the future implications for audiovisual formats, with the view of indicating the place of the software in the television to come

## 2. POWER: PROTOCOL, TRANSPARENCY, CONTROL, MODULATION

It is difficult to imagine the association between audiovisual formats and information technology without taking into account the space occupied by software in relation to television. The experiences of seeing and hearing, dissociated from the supports offered by cinema and conventional television (specific techniques to which they were linked during the 20<sup>th</sup> century) are forced to deal with the fundamental characteristics of software. Active for decades within the devices that

have been associated with information and communication technologies, these features have implications for the audiovisual content. Programming-based technologies entail two important ideas: free flow logic and institutionalization of transparency, marks defined as the traits of the protocol (Galloway, 2004).

In the original sense, relevant only to communication engineers, protocol is defined as the specifications for regulating data transmission. As a theoretical concept, protocol is present in telecommunications activities and computing mechanisms. In a broad sense, the Internet operates from many different devices: at one end, gigantic computers; at the other end, small-scale domestic machines (Norberg; O'Neill, 1996). Its connection depends on common references adopted by all, allowing their interrelation. Without the adoption of joint operating rules, it would be impossible to achieve a satisfactory result.

To achieve the expected results, interoperability between miscellaneous mechanisms becomes impossible without standardization. The definition of standards requires attention to governance and control. For information technologies, this administration is done from the protocol and the interoperational standards it presents. These specifications – as a jurisprudence, not as a law – allow, through the adhesion of different stakeholders, the possibility of joint action by governance, rather than by centralized government. The protocol takes part in the contemporary forms for the exercise of power in a reality that relies on ITCs. Understanding these relations implies remarking an observation from Foucault (1975, 1976): it is not a matter of understanding power in terms of limits to what one would otherwise be free to perform. Such technologies do not conceal another dimension that can be realised if such instruments did not exist.

Exceeding this particular format to modernity, the contemporary dimension of power is defined by the concept of control (Deleuze, 1990). In contrast to discipline, control is understood as management without confinement, eliminating it and organizing an uninterrupted flow that dispenses with closed institutions. For discipline, it is important to close a given system; for control, its opening becomes relevant. Confinement was defined as a mold, an analog dimension producing a given result. Control refers to modulation, creating variability from a format adjustable to its own modifications. The mold was associated with the duality between individualization and massification. Modulation produces control from collective assemblages, which are based on computational machines operating from the administration provided by protocols.

We describe the order of power in terms of the constituted set of relationships, taking into account their formal characteristics, consisting of the connection between isolated points arranged according to a diagram. In the

association between these points, one obtains a regularity, such as connections that establish rules. The transition from sovereignty to discipline, for example, is proceeded by the organization of a certain set of connections, resulting in a particular diagram, distinct from the previous format. A new combination is then prepared, with different possibilities for ordering power (Deleuze, 1986; Foucault, 1975).

The analysis of television and the cultural industry implies perceiving combinations, observing the formation of diverse diagrams. The review of the broadcast logic implied re-configuring previous possibilities, reconstituted by the expansion of cable services; production of original content by broadcasters, decoupled from conventional broadcast networks, and, most importantly, negotiation of this content on a variety of platforms. For broadcast, the diagram consisted of coordinating the audience through defined schedules, management of advertising, generality and indifferentiation of content. The appropriation, by television, of the format of the networks, in sets of broadcasters transmitting the same material, was an important step. A logic introduced by the radio following the establishment of NBC in 1926 allowed it to exceed technical limits for the diffusion of electromagnetic waves.

The adopted financing was derived from a specific type of advertising. After eliminating the intervention of advertising agencies and exclusive sponsors with specific programs, the networks were allowed to concentrate its production and finance by selling space not to one but to several advertisers. By the construction of the mass, it became possible to manage a resource of great importance: the public. The relationship with content was consolidated after a period of experimentation, involving actions in which CBS will prove essential. Unlike the later format, the 1950s was characterized by live audiovisual content produced in the New York City region, with networks engaging in distribution tasks. From the 1960s onwards, in light of the attention of the networks given to production, conducted with studios located in the Los Angeles area, recorded material was then developed, which was made available for marketing on several occasions. Redistribution was allowed to local or foreign broadcasters, giving relevance to syndication. The search for hits and the management of talent created a catalog (whose lapidary productions become shows such as *I Love Lucy*, *The Beverly Hillbillies*, and *The Andy Griffith Show*) that could be resold on a variety of occasions.

This combination of the practices involved and the established norms delimited a form ruled by inflexibility. As a result, the broadcast produced operations in which regularity prevailed. The survival of the model was guaranteed by closure to interventions of all kinds, in which the audience was exposed to

similar content flows at specific times, produced according to a single funding pattern. The reorganization of audiovisual content will depend on the emergence of new services, affirming its importance through the production of unpublished material. From the 1970s onwards, other broadcasters – whose paradigmatic format can be affirmed by TNT, CNN, MTV, The Movie Channel, and Nickelodeon – were created, diversifying mainstream television. The expansion of services removes the closure provided by the previous broadcast networks. Since then, several solutions have been required in the coordination of the new channels, seeking their negotiation for new entrants: distribution systems by cable and, later, satellite (Curtin; Shattuc, 2009; Gomery, 2008; Holt, 2011; Lotz, 2007; Williams, 1974).

Unlike the previous one, this diagram values the proliferation of distribution services, diversification of the content produced. and the systematic need to institute various forms of material negotiation. These services are defined as segmented channels, with material distinct from the previous generality. While cable and satellite operations consist of the first activity capable of reordering the broadcast, displacing the previous paradigm, the software-related audiovisual content, radicalizing this trajectory from modulation, control and protocol logic, comprises an experience that differs from both conventional and segmented television. As examples of molds, typical technologies of the 20<sup>th</sup> century depended on unity: a spectacle of a given duration in a dark room; a window for sequential broadcasting in the homes. Eliminating the centrality of cinema and television produces an intense diversity of mechanisms and techniques. The techniques of the 21<sup>st</sup> century value diversity, which could ultimately result even in the chaotic proliferation of incompatible devices.

It is possible to avoid this incompatibility by ensuring connected operation of various instruments. If modulation refers to the possibility of passing between different dimensions, the obtained result implies the guarantee of non-problematic circulation. For the audiovisual content, the continuous flow in free spaces of confinement should occur in a transparent way. For content that travels from information technologies, even the simplest operation implies coordinating very different resources. It involves the expectation of associating devices such as connected TVs, tablets and smartphones, synchronizing access to content in varied circumstances. It is a possibility guaranteed by adequate software resources, capable of transposing the audiovisual content without ruptures, from one base to another (Chiddix et al., 2000; Learn, 1988; McAdams, 2000; Wilson, 2008).

In the association between hardware and software, with different sizes, relevance and functions, programming codes should necessarily hide their traces,



not making them ever apparent; links should never lead to dead ends, dead pages or error messages; and servers should not be out of order or unable to secure access. For this experience it is important to guarantee that points of connection are always invisible between decoupled mechanisms. The proliferation of distinct media comes accompanied by the work of erasing their presence, allowing the belief in the automated passage between various registers. Since the first discussions on the network, much attention has been paid to the links and the connection provided by them (Johnson, 2001). In addition to the possibility of navigation, the links – as far as the concept of a protocol is concerned – operate as an instrument to ensure continuity. From the passage between distinct points, they constitute a spectacle that never stops, in an important move to ensure protection from any interruption. The protocol values its transparency.

In summary, this protocol enforces compatibility, as it involves the need for a free flow for the circulation of various resources. It involves building chains of objects operating relative to one another. This compatibility involves the definition of standards, guaranteeing the autonomy of traffic and circulation. The flow operates in terms of a particular type of modulation. It consists of the expectation of ensuring the systematic passage through registers, moving in these connected structures. The compatibility between hardware and software techniques has been present at several different moments in the history of computing. Its association is inscribed among the fundamental characteristics of ICTs, expanding to the various activities to which they refer. Understanding the logic of the development of contemporary audiovisual activities implies the thematization of software.

### 3. DEVICES, STORES, FLOW: APPLE, IPHONE, IPOD

If, in fact, software-driven contemporary audiovisual content radicalizes the renovation initiated with the dissolution of conventional television, nothing could simply happen without the distribution of content through a synchronized and transparent flow between the broadcasting services and the instruments for their access. For that reason, the iPhone is essential. This smartphone relates directly to the iPod and the synchronization previously built with the iTunes Store. These instruments are capable of defining a format for the negotiation of content through the Internet, distinguishing themselves from audiovisual objects (DVDs, Blu-Ray discs) or being distributed by stations. As a device that refers not only to telecommunications, but also to the media, the iPhone emerges as a layer between the various archaeological dimensions that define the protocol logic. Others involved in the activity, e.g. Google, will appropriate what Apple has introduced,

giving it a particular direction. These future developments are understood only by the attention to their constitution.

The iPhone is important for its ability to associate three skills, creating an object presenting capabilities that were previously non-existent. It concatenates scattered points, producing, as a result, an item that can work with each of them in an integrated way. It allowed access to 3G networks at the time of its introduction, when they were still in development, institutionalized the use of a particular type of software experience, guided by apps, which are similar but at the same time different from the way in which programs were used, and more importantly, it gives rise to ways for the diffusion of content through options that differ from those used by the cultural industry, initially in relation to music and later to audiovisual content.

The development of the iPhone affects the organization of both the cultural industry and the activities of mobile telephony. Understanding it in terms of the reorganization of audiovisual content implies observing an extensive process. Its beginning refers to the definition of the mobile connection; its expansion involves the production of telecommunications networks; and its extension occurs from the appropriation of cultural goods. Devices descending from the iPhone (iPads/tablets and, in a way, smart TVs) consist of instruments for systematic connection. They depend on the diffusion of wireless networks, a technique whose use expands from mobile connection mechanisms. They are associated, as an essential point of the built diagram, with broadcasting services that, in the midst of the expansion of P2P and torrents, adopt legally accepted procedures.

The iPhone is defined not only as a window for voice services, but also as an object in its own right, which would become a reality only after a massive amount of investment in various items. Agreements with telecommunication operations willing to join the project ensured Apple's control over its development, sales and advertising, allowing the creation not of a low-cost piece of equipment, but a significant product in itself. Its construction involves the introduction of new microprocessors and operating systems, as well as touchscreen displays. The creation of the iPhone happened through the association between Apple and Cingular (later acquired by AT&T), guaranteeing the use of the spectrum for the transmission of data, as well as the appropriation of 3G networks. The association occurs within the scope of the characteristic transformations within the sector of telecommunications in the USA, with consequences for diverse regions in the world.

The connection responsible for enabling content diffusion depends on a previous move: the aforementioned connection established between iPods and the iTunes Store. The organization of the iPod had taken part in Apple's expectation of

associating its different devices, building an integrated set of objects. This strategy was called the digital hub, using the iMac as the central infrastructure to interconnect devices with varied functionality, making this hub the mode of logic responsible for guiding its association with iPods and iTunes. Specific devices fulfill specific tasks, designed to value their association from the moment the sum of their features is considered.

The idea of a digital hub implies Apple's attempt to build tools that can relate to the media. Resuming a form of technology developed in the early 1990s, FireWire, which allowed the circulation of data on various devices, the connection with digital cameras was initially enabled, associating with them an editing tool, iMovie, launched in 1999. As a result, Apple introduced, in January 2001, its music management tool, iTunes. In connection, it presented its MP3 Player, the iPod, in October 2001, coordinating this set of items around the sound media. Access to content is ensured from the institutionalization of a digital store. Released in April 2003, the iTunes Store was based on the relationship with the major music companies: Sony, Universal, Warner, Bertelsmann, and EMI. The service, as it brought Apple closer to the cultural industry, delegated the opportunity to create and manage a virtually unknown sales service in the music industry to the enterprise, guaranteeing alternatives to the illegal dissemination of material.

From there, the direction repeated several times in the negotiation of content is defined from the logic of the protocol. At that time, the link between the iTunes Store, iPod and iMac provides access to immense catalogs; In the case of Apple, they became able to circulate as a priority in all of its devices. From this event, the interrelationship between several items was established, providing the experience of integrated, transparent operation between hardware and software, as a consequence of Apple's possibility of rapidly introducing connected and functional products that had been unknown until then.

Certainly, the logic followed by Google, and later endorsed by other manufacturers, values the diversity of enterprises, and, due to this variability, the guarantee of connection between various devices. The closed universe of objects projected by an enterprise gives way to an environment that adheres to modulation in a radical way. Nevertheless, despite being relativized by distinct but inter-associated manufacturers, Apple's trajectory is important because of the model in which it operates (Curwen; Whalley, 2009; Isaacson, 2011; Kenney; Pon, 2011; Marchi, 2011; Vogelstein, 2013).

The association between these information technology resources depends on the expansion in the creation of applications, as well as the possibility of their distribution. On the one hand, policies introduced by Apple are important in relation

to this software; on the other hand, the way in which app stores are organized is highlighted. The observation of conditions for ordering the possibility for large-scale creation of these applications and dissemination of this type of software allows us to understand a key element in the future development of the cultural industry. The decision to allow the creation of apps not only by the iPhone manufacturer, but also by other developers, becomes important, revisiting Apple's previous decision to restrict production, repeating the stance adopted decades ago in relation to personal computing.

Equally relevant is the obligation, according to interoperability standards, to allow the compatibility of resources. Ensuring the operation of the operating system produced by Apple with the applications to be created implies the publication of software development kits (SDKs, i.e., tools that allow other developers to create programs compatible with iPhones). It aims to achieve the typical transparency of the expansion of digital resources while ensuring, with respect to smartphones, the invisibility and transparency responsible for associating these technologies without failures ("Developers wary of Apple third-party talk," 2007; "iPhone to Support Third-Party Web 2.0 Applications").

In addition to producing another typical object of the mobile phone industry, Apple defines a logic that can be resumed under other circumstances. Besides the configuration of a particular object, the model developed by Apple allows the structuring of the logic from which it operates, with resources from the cultural industry – music and, more importantly, audiovisual content – according to procedures that differ from those instituted by broadcast media. The association between diverse devices, connected in a compatible way, associated through the typical sense of transparency to the demand for modulation, operates with a major impact.

Part of this transition involves Apple TV, an experience of the enterprise itself with audiovisual content. Released in March 2007, it combines a set-top box with TV sets, making it possible to market content via the iTunes Store, this time including audiovisual content, and serving as a broadcast channel for streaming services such as Netflix or YouTube (SEC, 2007). Interestingly, Apple TV proves less important than the characteristic format of the iPhone-iTunes Store. This activity merely repeated what had been instituted by smartphones, with less relevant consequences compared to other objects. In the case of audiovisual content, Apple repeated what it had previously produced. The actual consequences in terms of their unfolding depend on other characteristics, described in the next section.

## 4. SOFTWARE ONLY: GOOGLE AND ANDROID

Speculation about Google's audiovisual project began in March 2010. This initial venture, identified as Google TV, involves the association with Intel, Sony, and Logitech. It refers to an alliance between several enterprises, motivated by different interests. For Google, the focus is not on equipment, but on software. Announced in May 2010, it aimed to introduce Internet access to audiovisual devices. The aim was to expand the use of Android, already important for mobile phones. The connection to the network would depend on the adaptation of the operating system to TV sets and Blu-Ray disc players manufactured by Sony, as well as Logitech's set-top boxes, operating with Intel Atom microprocessors.

Google's participation in audiovisual formats implies an association with the largest possible number of manufacturers. Speculation between the announcement of the proposal and its actual release point to the interest of Samsung and LG, due to the previous association of both with Google in relation to smartphones. Adapted to Google TV, their devices, as with smartphones, would become compatible with apps running on Android. Software features were introduced in these devices, connecting them to the Internet, transforming them, and orienting them through the modulation that guides the protocols.

Other set-top boxes already in operation allowed a more restricted access compared to what was expected with Google TV. This connectivity was not defined: until then, it included limits whose overcoming is observed only from innovations such as those that this project intends to introduce. The expectation was to produce the same result obtained from the iPhone. Furthermore, this transformation replicated a process similar to the one which occurred decades ago with personal computers. The operating systems that ensure their operation allowed these machines to run very diverse apps following the adoption of the same resource.

The launch of Google TV took place in October 2010. The television networks ABC, CBS, Fox and NBC decided not to participate in the project, avoiding adapting their resources to the distribution of online content in this format. A cable or satellite service would only concern itself with material licensing for a specific technology; however, adherence to an Internet traffic service implies resorting not to practices such as syndication, but – as a trait of the protocol – to the imperative of connecting to the highest possible number of additional resources, such as streaming platforms or virtual stores for productions. On the one hand, the agreements made involved Netflix; on the other hand, they involved the association with Turner Broadcasting (granting access to TBS, TNT, CNN, Cartoon Network, and

Adult Swim) and HBO, both owned by Time Warner (BILTON, 2010; MILLER; STELTER, 2010; NUTTALL, 2010a, b).

An instrument following Google's involvement with audiovisual content was Chromecast, released in July 2013. Its significance lies not on its low value or its wide diffusion. It consists of the possibility of associating TV sets connected to tablets/smartphones, turning the use of such devices into an extension of these two instruments. Rather than providing a window for access to one or another content service, Chromecast expands features present in computing instruments. Through it, the tablet – an object introduced from the iPad and Apple's experiences, despite its dissemination by other manufacturers – becomes the instrument that allows the handling of apps executed on the TV sets. This is an alternative to set-top boxes – including Apple TV –, which were, until then, the only way to program a TV.

With the dissemination of smart TVs, the possibilities of devices such as Chromecast should evidently become obsolete in the near future. Nevertheless, in the gap between the massification of smart TVs, this low-cost device managed to turn TV sets into an extension of computing instruments. This use is guided by the logic of transparency and invisibility present in several associated technologies. In its own way, Chromecast connects the structure offered by the ITCs (tablets/smartphones) with content stream (virtual stores, streaming applications). It reaffirms the distribution of material without failures, passing through the various instruments available as if there were no barriers between them, in a transit without obstacles by disparate groups of techniques, providing the notion of absence of friction.

Following its launch, Google associated Chromecast with YouTube. Similarly, it connected it to Netflix, delivering benefits such as a three-month guarantee of free streaming access, in an investment paid for by Google itself. Any connection between platforms depends on alliances between different enterprises, which are not always possible. Chromecast's operations involve agreements with Apple's iTunes and Amazon Video. Hulu was only licensed in September 2013 and HBO Go in October 2013. In February 2014, the SDK of the device was released, allowing its expansion beyond the enterprises initially chosen (Baumgartner, 2013; "Chromecast adds HBO viewing," 2013; "Google Cast SDK finally launched," 2014; Miller, 2013; Spangler, 2013).

Google's third initiative is related to the launch of Android TV in June 2014, with the participation of manufacturers such as Sony, LG, Sharp, Asus, and Intel. The effort to ensure the association of these enterprises with the larger Google project, which goes beyond one item, as was the case with Chromecast, has been resumed. Android TV repeats the expectations of previous years regarding Google

TV. It continues the attempt to transpose the importance previously acquired by the operating system in smartphones to connected audiovisual devices. It distinguishes itself from Google TV by the absence of the association with the previously established structure of segmented television. The 2010 investment associated the Internet with traditional services of segmented audiovisual content. It allowed the use of browsers in TV sets at a time when apps for access to content were still little known.

Clinging to the legacy of cable and satellite television justified the participation, in Google TV, of an operator such as Dish Networks, willing to maintain its distribution services as they had been doing for 20 years, with the addition of Internet connection. With the expectation of moving away from traditional operators of segmented television, Android TV, however, focuses specifically on apps. Once established, this particular logic for access to audiovisual content in search of a model would allow the ignoring the previous structures of television, creating others. Applications accessed via online stores, operating on devices connected with transparent circulation of information, initiate a process that implies the possibility of image consumption that relies, in particular, on software.

In January 2015, Google announced its association with Sony, Sharp and Philips TP Vision for the use of Android in these manufacturers' devices. On the same occasion, other parties involved in the manufacture of TV sets pointed to the use of different technologies. Samsung is defined by its own operating system, Tizen, as a way to reduce dependence on Android, and LG stands out thanks to the software purchased from HP in 2013, WebOS. These are indications of the multiple possibilities available. The launch of devices connected to Android TV took place in April 2015, with the Sony line for TV sets with 4K definition and Internet connection, followed by Sharp in June 2015. Dissociating itself from the project, Panasonic, in May 2015, adopted the Firefox OS, an operating system developed by Mozilla. In terms of content, Android TV associations repeat previous connections with Chromecast: Netflix, YouTube, Hulu, Amazon Video, PBS KIDS, and HBO GO.

The announcement of Android TV takes place simultaneously with other projects for the expansion of the operating system in diverse devices, turning the presence in audiovisual instruments into part of a wider experience. These consist of household items, cars, and possible clothing accessories, allowing the presence of technology in very different places: Android Wear, operating on Samsung Gear Live and LG G watch; and Android Auto, for use in vehicles. The definition of technologies capable of operationalizing different instruments turns distinct objects into possible items coordinated through a single operating system. The expectation

placed on such watches, TV sets and telephones refers to instruments associated with the features offered by this software.

The possibility of having the same programming feature in these different instruments refers to the possible results obtained from the presence of compatible software in varied objects. A viable and functional resource operating on all these items makes the presence of other programming technologies in this network extremely difficult. The expansion of Internet protocols for audiovisual devices, among other objects, demands the creation of flexible standards, capable of operating on devices that are diverse, but guided by a single format (Baumgartner, 2014; Chen, 2014; Espelien, 2014).

Google's specificity lies in the way it focuses on software. The focus lies less on the production of devices, as in the case of Apple, and more on programming resources, despite their occasional appearance as attempts with little economic use. Google's attention to the dissemination of this resource, the expectation of allowing its presence in varied objects, and the interest in an ubiquity linked to its invisibility are issues that imply attention to modulation and, more importantly, to the typical flow regime of control. At various times, the inability to define a functionally integrated product suggests a certain difficulty and a certain limit to Google's initiatives. The opposite of an alleged failure is to pursue, in multiple attempts, opportunities for the insertion of this software.

## 5 CONCLUSION

From the association between iTunes and iPhone/iPod, Apple had defined the notion of flow: limited linkage, restricted to the resources of a single enterprise, is important due to delimiting a previously non-existent format in relation to the transposition of the cultural industry to the Internet. As an object, a concrete product, the iPhone presented the future direction for the associated operation of diverse items. These mechanisms are linked to connected TVs on the one hand, and mobile applications on the other. The connection between the three becomes essential in a format for audiovisual distribution differing from the previous paradigm, which was important for conventional television, based on the flow of programming offered by content broadcasters.

This logic introduced by Google and Apple takes part in a broader, developing parameter. It is not merely a case-by-case description of an idiosyncratic experience, but rather a format with the opportunity to remain in the future constitution of the audiovisual content. This paradigm relies on the integration of mechanisms that are distinct, but necessarily associated, and responsible for allowing the broadcasting of content. It depends on the software



and the possibility to ensure this transparent flow from information technologies. The resulting model operates from the triad consisting of smart TVs, tablets/smartphones and content applications. These items matter not in isolation, but only in their interconnection.

Each object matters in terms of the powers it can deal with. Smart TVs stand out as a device similar to TV sets as we know them, although they actually consist of hardware capable of programming. The smartphones or tablets are defined as mechanisms from which the computer instruments that televisions have become can be operated – a set whose meaning lies in the possibility, in spaces connected through wireless connections, to take advantage of the content apps and windows that offer access to audiovisual content. The apps themselves allow the choice of content from distribution strategies of the most diverse producers, making it a tool for these creators to disseminate material.

In this model, the operation of the format contained in this triad refers to the legacy introduced by resources presented by Apple and Google. In the format of the television to come, this logic is still undefined and identifies not only content producers or broadcast networks, but rather software enterprises creating information technologies, as they would in any activity for which programming has become important. As opposed to the past, they do not consist of instruments responsible for broadcasting electromagnetic waves from analogue tools. The software, and its introduction, establishes a format based on modulation and control, as well as transparent connections of associated items in flow.

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