

**Mapping the core actors and flows in streaming video
services: What Netflix can tell us about these new media
networks**

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Introduction

'Streaming' services are a new and fast-growing element in media industry ecosystems – examples include Netflix, YouTube, Amazon Video, and Spotify. For customers, these simply represent an additional means of consuming digital content, but for the media industry and the scholars that research it, these organisations are complex. They represent not only a new technological option for the distribution of content, but also new ways of financing and licensing that content, for acquiring audiences and communicating with them, for charging for content, and for the creation, categorization, and consumption-analysis of content.

The goal of this paper is to map how these organisations function, investigating in particular the core process stages and activity 'flows' that form the heart of their services. We use Netflix as our example, the first truly global television network and a major streaming provider of audio-visual content, mapping in detail how it moves content around the globe generating revenue.

By 'streaming service' we mean a service that provides a large menu of audio-visual content available immediately on demand over a data network. The majority of streaming services charge a subscription fee from their viewers, although some, such as YouTube, are financed by interstitial advertisements (mixed funding models combining the two can also be

found.) Some services provide only shows produced by the company, the most notable example probably being HBO, while most services provide licensed content or a combination of the two.

Previous research

The television industry has changed tremendously since YouTube was launched in 2005, and Netflix switched to a streaming service in 2007, changes that are described in detail by Amanda Lotz (2014; 2017). As a pioneer of a new model for the provision of audio-visual content, and as a service that has enjoyed phenomenal growth, Netflix has itself been the focus of many studies.

In the next section of this paper we discuss Netflix's hybrid status, in that it is both a media and a technology organisation. Much scholarly discussion on Netflix to date addresses aspects of this duality, for example how Netflix allows for a nonlinear television (and film¹) experience, where customers can browse a huge catalogue at will, see (Arnold, 2016; Jenner, 2016; Johnson, 2017; Lotz, 2014), and on Netflix's innovations around its automatic recommendation engine and how this shapes the viewing experience (Alexander, 2016; Finn, 2017; Madrigal, 2014; Smith-Rowsey, 2016). Studies of users of Netflix and other streaming services are also slowly appearing (Bucher, 2018; Spilker, Ask, & Hansen, 2018). Several researchers have followed up on Williams' long-established observation (1975) that the nature of programme formats in part reflects the possibilities of the prevailing technology, thus linking changing TV aesthetics with changing technology and new viewer habits, (Lotz, 2014; Jenner, 2016)

A growing body of literature discusses how the economy is changing in the television industry. This examines how different actors position themselves strategically in this new

landscape (Evens & Donders, 2018; Gimpel, 2015; Hesmondhalgh, 2019; Lobato, 2019; Lotz, 2017). Several researchers note that control over “the last mile,” i.e., the physical connection to the end audience is an important strategic advantage, and that those companies whose services bundle internet access with audiovisual content are most likely to succeed competitively (Evens & Donders, 2018; Gimpel, 2015).

Another scholarly discussion that also touches on Netflix is the question of what constitutes a media company today, and the implications how a company is categorized has on how it is regulated and taxed. Netflix is one of many companies that rely on advanced computer technology to deliver its services. Gillespie (2010) argues that Google’s decision to label its daughter company YouTube as a technology company rather than a media company brings relief from regulatory and tax burdens. Some scholars suggest such companies are in fact media companies and should be taxed and regulated as such (Napoli & Caplan, 2017). Hesmondhalgh (2019), however, while agreeing that these companies’ status allows them to avoid regulatory and financial burdens, argues that companies such as Netflix work in very different ways than traditional media companies, and have a very different culture, and thus should be seen as technology companies moving into the media industry field.

The centrality of technology inside these organisation is stressed by Hesmondhalgh, and indeed in many studies of internet-distributed television in general, and of Netflix in particular, notably on elements such as the automated (“algorithmic”) recommendation engines, or the importance of the “last mile”. Fewer studies however have examined the entire technological architecture required to deliver these services in their totality. Mention is made in Lotz (2014), Lobato (2019), discusses them in more detail but as a backdrop for discussions of other issues, and an examination of Netflix’ role in the debate on network neutrality can be found in Davies (2016). An example of a more comprehensive analysis of streaming technology architecture can be found in Erikson, Fleischer, Snickars, Johansson

and Vonderau's book on Spotify (2019), but notably the authors conclude that Spotify is so complex that it is impossible to view in its totality. In this paper, we share Erikson et.al.'s conclusion about the complexity of streaming organisations' technological systems, drawing in part also on Actor-Network theory (cf. Latour, 2005), but we also argue that while Netflix's technology is indeed highly complex, it is possible to create an abstract model of it that can assist our understanding of the company's workings, and draw conclusions on its potential impact on the wider media industry.

Method and research approach

Streaming video services are a new actor in the media eco-system and developing fast. While they receive exhaustive coverage in the business press, they are under-researched from a scholarly perspective. This may stem from their emergent nature, and from the fact they are hard to fit into existing media management industry typologies. While players in the streaming industry tend to be grouped together into a segment, perhaps because they have streamed media content at the heart of their activities, they exhibit a high level of diversity – extending from business rationales and funding basis, to business models and value propositions.

While all are variants of media companies, some are also platforms; while all produce and distribute media content, they all have significant technological competencies and infrastructures to the extent that they are as much technology organisations as they are media ones; some, like YouTube, Amazon Video and HBO Now, are divisions of large conglomerates and others, such as Netflix, Spotify and Hulu, are standalone businesses; their content can be provided by professional third-parties, original to them, or created by users; they compete with national linear broadcast offers on a global basis (radio and television), with services for downloading and saving media content (iTunes), and with the purchase of

media content (CDs, boxed sets).

This has two implications for this paper. First, because one goal is to map the core processes in this new media business model, it reduces complexity by focusing on a single streaming media organisation, Netflix, which served as a single ‘exemplary’ (Yin, 1994) and ‘instrumental case’ (Stake, 1995), meaning that it has the potential to provide insight into a number of substantive issues. Netflix was chosen because it is a standalone entity (unlike, say, YouTube or Amazon Prime Video), with a focused and clearly delineated product offer, and is publicly listed (meaning financial data is available). In addition, it follows a relatively open corporate communications policy.

The second implication is that because streaming media players in general and Netflix in particular are evolving fast, and because their activities undercut existing sector boundaries and definitions, no single theoretical lens or research stream emerged as most relevant to analyse the phenomena under review. This paper therefore employs an exploratory approach and draws on a number of different theoretical concepts in its discussion. Empirical data was from drawn secondary sources: industry reports (Soper, 2017), press accounts (Wong, 2016; Stokke, 2013; Madrigal, 2014), tech blogs (Hoff, 2012; Ueland, 2015), and company documentation (Netflix, 2016). Valuable pointers and insights were also drawn from three semi-structured interviews during the winter of 2018 with developers in Vimond, a company that delivers streaming technology services to broadcasters worldwide.

This study represents an initial stage of a larger project that explores how streaming technology is influencing the audio-visual content sector, specifically how it changes how value is created and distributed. This larger project will additionally analyse the technologies employed and the actors involved.²

Context

Streaming media distribution services are a recent and popular phenomenon. Between 2011 and 2016, the subscription streaming services market in Europe grew by 128% annually (Grece, 2017). In the US, over half of all households subscribed to a paid streaming service as of April 2017, and Netflix had half of the country's household as its customers (Statista, 2017). In Scandinavia, penetration is equally high, with Norway in the lead, where 61% of households subscribed to paid streaming as of the end of 2016 (Grece, 2017).

Customers cite access to exclusive content and ease of use as prime reasons for subscribing to streaming services. 'Ease of use' has many dimensions. These include the ability to watch regardless of television schedules ("time shifting"), the option to view several episodes of a show in one sitting ("binge-watching"). In the UK in 2017, Ofcom found that 79% of adults used streaming services to "binge-watch" television.

About Netflix

Founded in 1997 as an online DVD mail-order rental service, Netflix is now a global movie and TV series entertainment network, offering streamed content on subscription basis on any internet-connected screen (Finn, 2017). The value proposition is flat fee, on-demand, unlimited and advertising free consumption and no-hassle online cancellation – members can leave and re-join when they want.

The proposition proved compelling. Netflix moved into profit in 2003 and into the internet streaming of movies in 2007. In 2011 the DVD and online businesses were split and Netflix also moved into original programming. In the same year Reed Hastings was named CEO of the Year by Fortune magazine. Netflix has expanded internationally progressively, and now operates in 190 countries, reaching 125 million subscribers worldwide as of April 2018. Turnover has grown consistently since 2008 and in 2017 was \$11.69 bn having

increased 32.4% on the previous year (Netflix, 2018). Although the company is profitable, its cash flow is negative. In 2018 it plans to spend \$8 bn on content which will include 700 original TV shows, including 80 non-English language original productions from outside the US. In comparison, Hulu spent \$2.5 bn on content in 2017, NBCUniversal \$10.2 bn and Disney \$7.8 bn, while Apple plans to spend \$1 bn in 2018 (Patel, 2018). Netflix's investments in original content production are financed via long-term debt (Netflix, 2018b). The company is listed on Nasdaq, and its shares are held mainly by institutional investors.

Netflix may be described as a platform business and a network business. As a platform, its central purpose is to 'match' users and facilitate the exchange of goods and services, thereby creating value for all participants (Rochet & Tirole, 2003; Evans & Schmalensee, 2016; Parker, Van Alstyne and Choudary, 2016). Platform businesses grow and thrive, not by acquiring other businesses or fixed assets, but by connecting more and more users within their networks.

Networked environments exhibit particular characteristics (Arthur, 1994; Shapiro and Varian, 1999): the value of a product to one user depends on how many other users there are (known as 'network externalities'), so the value to users increases as more users join, and scale effects mean that as the number of users grow, the costs of serving each user decline, improving profit margins. These effects only kick in if the network grows substantially, so network business like Netflix need to grow fast, or 'scale'.

This central mechanism influences many aspects of Netflix's strategy and value proposition (Küng, 2017). It mandates fast growth, thus Netflix's rapid international expansion. That growth is taking place in markets that already have significant free-to-air provision, mandating an emphasis on a wide range of content, that is as exclusive as possible, and can justify a subscription fee. Attracting new customers and keeping them mandates a user experience that is straightforward, featuring easy selection, the ability for multiple

household members to receive different content, seamless viewing across different devices, and a personalized user interface that learns and makes recommendations based on prior selections, and offers control over when to play/pause/resume, any screen.

Netflix is not however a classic double-sided platform, in that it is not a marketplace that connects buyers and sellers (like, say, YouTube which matches content from millions of producers to audiences and advertisers). Netflix's network characteristics derive from its large-scale analysis of users' interactions, which it uses both to algorithmically tailor-make recommendations for each individual user and to decide which new series and films to commission. Analysing the consumption behaviour of users, Netflix' algorithms identify those that have similar tastes, and uses these insights to refine the suggestions. Network externalities therefore take the form of spillover benefits where the participants in a network benefit from interactions that they were not personally involved in through better programming and more accurate recommendations.

From these factors stem other aspects of business model and strategy. Netflix invests heavily in content acquisition and marketing to drive subscriber growth and retention - in 2018 it will invest \$8 billion in content acquisition and £2 billion in marketing (Netflix, 2018). It keeps its subscription price low and pricing model simple model to reduce barriers to entry and friction in sign up. It invests significantly in technology to ensure quality of user experience (although some tech services are provided by third parties, as discussed below), and not least in the data analytics competence at the heart of its business model.

The basic model of streaming video service

While individual companies exhibit differences, streaming video services share a common technological setup that combines five different stages and taken together these form a network of actors ('actors' here meaning firms or groups of firms that deliver similar

services). Figure 1 below presents a simplified depiction of this.

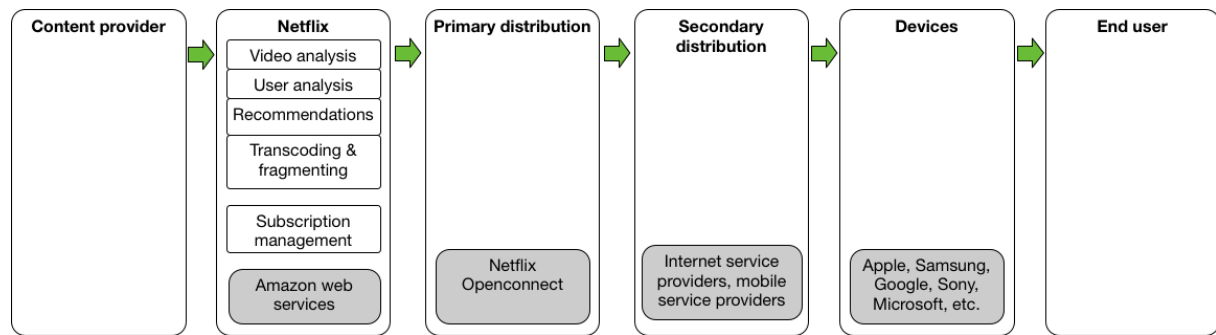


Figure 1: Core stages and actors of Netflix's streaming video service, annotated with key external partners³

Acquisition from Content Providers

In each market content Netflix licenses content from multiple suppliers. It bids for exclusive rights to SVOD rights against cable and broadcast networks and online suppliers, typically buying multi-year exclusive SVOD licenses. At time of renewal it evaluates viewing, as well as number of similar titles, to determine whether it will re-buy and how much it is willing to pay. Payments are fixed and not scaled according to number of subscriptions or viewership figures.

Netflix also commissions its own original content and these investments have grown progressively. This started with the scripted series *Lillyhammer* and *House of Cards* in 2012 (the first 'Netflix Originals', cf. Moore, 2016) and moved on to movies. A unique dimension of this content is that insights from its analyses of actual viewer habits are central to commissioning decisions (Finn, 2017, Smith & Telang, 2016; Fritz, 2012; Vanderbilt, 2013). This strategy has been successful and its original series such as *Orange is the New Black* and *House of Cards* have garnered both viewers and an enormous buzz in the media. The strategic rationale for this is a belief that original content strengthens the brand and drives up viewing hours. In practice, it reflects the fact that the OTT offers in the market are

remarkably similar which undermines their value and encourages switching. Original content therefore creates both strategic differentiation and lock-in, where subscribers ‘hooked’ on particular content and on a series and are unlikely to cancel their subscription (Küng, 2017). Further, because Netflix doesn’t need massive opening night audiences, it can experiment with niche products and diverse storylines, since its aggregates viewership over a long period fuelled by word of mouth promotion.

Netflix

The ‘Netflix’ stage in Figure 1 contains computational processes that the company performs on video files as soon as they are acquired. These includes transcoding and fragmentation, and data analysis of video content and profiles and behaviours of users, which taken together are used to generate personalised recommendations. These are independent processes (but have been grouped in the figure for the purposes of clarity) and break down as follows:

Transcoding and fragmentation

Netflix’s content is consumed on a wide variety of screens (see below). To cater for these many different versions of each video file are required. They are scaled to different sizes, and also versioned for different ‘codecs’ (‘codec’ is short for coder-decoder, the protocol for coding and compressing video into bits). The process of creating these different video files, more than a hundred different versions for every television episode, is called ‘transcoding’ and is the part of video streaming that requires the most computer processing power. Netflix has ‘migrated’ this computation to Amazon’s AWS cloud computing service.

Netflix subscribers can continue watching from where they left off, even if they switch devices. To achieve uninterrupted streaming in varying bandwidths, on different hardware, all the video files in different sizes and codecs are stored as short fragments in

dedicated “fragment servers”. These processes are also cloud based and performed using AWS.

Video analysis, user analysis, and recommendations

Netflix seeks to put the viewer in control of consumption. This means, as CEO Reed Hastings explained, “It’s fundamental to that control orientation that we don’t cram advertising down viewers’ throats” (cited in Wu, 2016; 329). Thus, data analytics lies at the heart of its business model. This activity combines machine learning and algorithms with human intelligence. Users’ viewing habits are tracked and analysed. In addition, large teams of people have been trained to analyse and tag Netflix content with metadata to create a database with fine-grained descriptors of every offer. These product attributes range from the obvious (plot, actors, genres, period and so on) to the subjective (moral status of characters, degree of plot resolution), and combined they form a matrix of close to 77 000 classes or “micro-genres” (Madrigal, 2014; Finn, 2017).

When the tags are combined with customer intelligence derived from analysis of viewing habits, Netflix can develop personalised recommendations that resonate closely with members’ viewing preferences. Netflix is also using insights from this competence to commission content itself (a significant departure from the piloting process standard for the development of scripted entertainment products). This process is also computing intensive and performed in the cloud.

According to the resource-based view of strategy (Wernerfelt, 1984; Barney, 1991) Netflix’s competence in data analytics is a strategic capability that creates competitive advantage and allows it to achieve superior returns. It meets the so-called VRIN criteria in that it is ‘valuable’ – provides rents and is a source of differentiation, rare – the capability is exceptional rather than standard, inimitable – rivals would find it hard to replicate to this

standards and non-substitutable (creating a significant competitive barrier for traditional national broadcasters seeking to compete with streaming services in their home markets).

Primary Distribution

In contrast to traditional broadcasting, which is mainly national in reach, the major streaming services are global. To allow for efficient delivery of video in all countries, Netflix and other major streaming services rely on content delivery networks (CDN). These are central elements of streaming services, and new to media distribution systems.

A CDN is a network with its own cables running in parallel with the internet, connecting servers in metropolitan areas on every continent. When a viewer in Norway requests an episode of *House of Cards*, that episode is not transferred from California, but via a CDN from a server in Germany to the hub closest to the user, where the stream is connected to the regular, open internet. Several commercial CDNs exist, powered by large technology companies such as Akamai, Limelight Networks, Microsoft and Amazon CloudFront, with sophisticated business models and pricing strategies (Hosanager, 2008; Popescu et.al., 2018). Both Netflix and Google (owner of YouTube) operate their own CDNs to ensure quality of service and minimal latency. As with other tech elements in streaming services, CDNs involve intense computing and consume considerable amounts of energy (Popescu, Yao, & Ilie, 2018). Netflix alone is reported to account for over a third of all internet traffic.

Secondary Distribution - "the last mile".

The final delivery to subscribers is done by consumers' broadband internet connection - optical fibre, television cable, telephone line (twisted pair), mobile telephone network, or another technology (in Netflix parlance, this stage is known as a 'service household'.)

The streaming service provider pays for the video flow until it reaches 'the last mile'. At this point, neither the streaming service nor the larger tech companies 'own' the video flow

as it belongs to the internet service provider and is paid for by subscribers via their own connection to the network.

Netflix's CDN offers an 'Open Connect Program' under which Netflix installs its own servers at no cost in ISPs' data centres which are directly connected to the Netflix network. Some large ISPs have tried, unsuccessfully, to charge Netflix interconnection fees for 'prioritised access' to their networks.

Devices

Netflix's content can be viewed on a myriad of devices (the company claims to support 200 different ones). Mobile viewing is growing in popularity, but streaming video is also consumed on computers, on large screens ('smart TV' sets have applications for watching major streaming services such as Netflix, and also have a "set-top box" in between, (as an Apple TV, a Chromecast player) or one provided by the cable access provider. Gaming consoles are also used to connect the television screen to the streaming service (platforms such as Nintendo's PlayStation and Microsoft's XBox ship with apps for Netflix, YouTube, and other services).

Netflix must ensure its content works on a diverse range of screens. Differences concern not only the size of the screen (which range in diameter from a few centimetres to over a meter) but also in terms of screen resolution (the number of pixels contained within the screen). A mobile phone may actually have higher resolution than a 50-inch TV screen. Further, because computer screens come in many sizes, and viewers switch frequently between screens, the window for video playback needs to be able to resize fluidly at any time.

Activity flows between the five classes of actors

A streaming media service, such as Netflix, has five core stages involving a network of actors, as discussed above and shown in Figure 1. In addition to this are a number of

‘activity flows’, which also constitute building blocks of the system, and which in addition also encapsulate many of the fundamental differences between streaming and legacy broadcasting models. These were identified the using ERAF actor network analysis, which maps Entities, Relations, Attributes, and Flows (Kumar, 2013) and are the: (1) video content flow, (2) the intellectual property rights management flow (3) the value capture flow and (4) the flow concerned with control, data capture and analysis.

The video content flow (from content producer to end user via the streaming service, primary distribution, and secondary distribution), is analysed in the preceding section of this paper. Below we analyse the other three flows.

IP Rights Flow

Video streaming is at its core also an intellectual property rights business. Streaming services like Netflix broker access to libraries of media content. They can be viewed as ‘legal’ incarnations of the pirate sites (such as PirateBay or PopcornTime) which provided similar libraries of content, illegally (Spilker, 2017). Illegal services apart, for traditional broadcasting systems, IP rights have traditionally been negotiated per each national market.

Netflix negotiates terms with copyright holders to rent IP rights for a certain period of time. For Netflix, as for traditional broadcasters and television networks, this involves creating contracts and making payments. When customers initiate a content stream, in parallel to the video flow a transfer of rights from producer to streaming service, and then to the end viewer takes place (see Figure 2), supported by login mechanisms and databases that check each viewers' subscription and place of residence. We have not described these authentication processes in detail here, but they are advanced, and central for trust in the whole system. The nature of this flow represents a significant departure from the IP management systems found in legacy broadcasting systems.

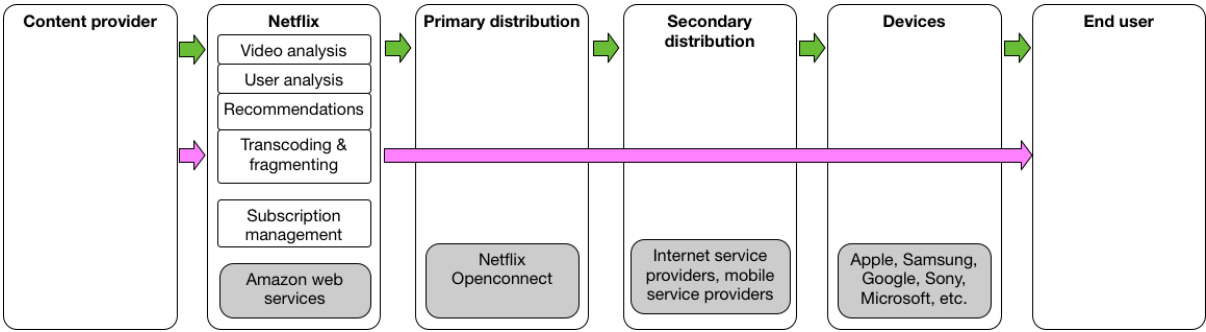


Figure 2: Video flow (green) and IP rights flow (pink).

Value Capture Flow

Netflix charges its subscribers a monthly fee and this revenue needs to be billed, received, recorded, exchanged into other currencies, and distributed between other partners in the network. Netflix’s international billing infrastructure has been migrated to Amazon’s AWS service. This includes transactions and compliance activities. The value capture flow is mapped in Figure 3.

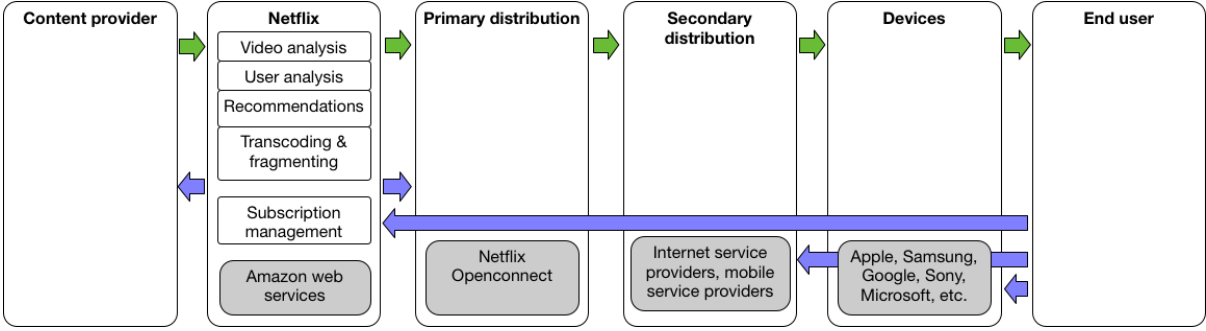


Figure 3: Value capture flow (blue)

Netflix has, as mentioned above, invested heavily in content acquisition, and the revenue from its subscription base has not been enough to cover these costs, it is financed through long-time debt. Netflix also needs to pay for primary distribution, which it has chosen to develop itself, instead of using the services of one of the many actors in this market. In addition, Netflix relies on Amazon Web Services for all its heavy computing, which also is a

cost (not drawn in Figure 3).

End users do not only pay for their Netflix subscription, they also finance the two classes of actors closest to themselves: devices and secondary distribution. Users buy all their different screens and set-top boxes, and they also need to subscribe to an internet service, whether wired or wireless.

Data Capture and Analysis Flow

The last flow is the data flow. All actors in the network collect data from the other actors, although Netflix clearly is the most data-centric of them all. Netflix collects metadata about the films from the content providers. It logs all interactions between users and their systems, and use them to provide recommendations, as mentioned earlier. These recommendations are valuable data for users, as they help them navigate Netflix’ vast catalogue.

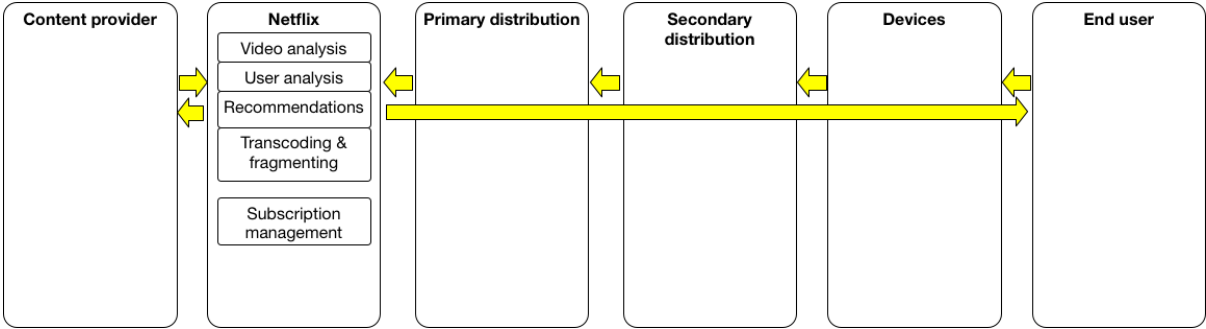


Figure 4: Data flows in the network

But the other actors also collect data. Most, if not all, of the devices used to view Netflix can collect data on use and transmit this to the producer. When we watch Netflix on an Apple TV, Apple captures this data, and the 2018 version of the Apple TV OS will include Netflix favourites in its own recommendations in the device’s “TV app”. Internet and mobile service providers (secondary distribution) collect traffic data to ensure service quality, but also to guide pricing strategies. Content Delivery Networks’ (primary distribution) role is to

swiftly move large files across oceans as requested by users, and they devote considerable computing resources to find the optimal route for large files, depending on where the desired files are stored, where the user is, and how much traffic there is in the network at any time. Content providers are most likely the least data-centric of the actors, but even they may collect data on use in order to check if they are paid correctly, and to use viewing preferences as input when they create new episodes.

Discussion

The streaming media providers are new and important actors in media systems. Taking Netflix as an example, this paper has mapped how one example of such an organisation functions, identifying the core process stages and the central activity ‘flows’ in the organisation’s network, and discussed their inter-relationship with business model and value proposition, and explored the influence of network externalities on those elements.

Identifying core process stages and flows, in conjunction with strategy and value proposition, has therefore provided valuable insight into how streaming services function. The research also raises some fundamental issues, which have implications for understanding existing audio-visual content sectors, and media management scholarship.

While streaming media organisations share similarities - in terms of their core process stages, and because all are engaged in the provision of media content - they also exhibit a high degree of heterogeneity. This raises a fundamental question. Although these organisations operate in a similar way and supply similar services, in fundamental aspects they are not similar at all. Is it analytically valid therefore, to group streaming media service providers into a single category? In at least one aspect, the technical setup, it seems to be a valid category. As discussed above Erikson, Fleischer, Johansson, Snickars, & Vonderau's 2019 study of the music streaming service Spotify ‘map’ this service in a way similar to the depiction provided

in this paper. Despite a number of intrinsic differences, it is clear that Spotify and Netflix rely on very similar technology. Just as “broadcasting” in the 1980ies could be used as shorthand for a complex, but standard, collection of technologies of production and distribution, it seems likely that what we mapped in this paper is a fairly standard “streaming” setup.

Still, or because of this, streaming media organisations like Netflix are difficult to categorise using existing typologies. As observed earlier, they are neither media companies, nor tech companies, but tech-media hybrids. For Netflix, as for Spotify and YouTube, technology is at the core of all central activities and its bases of competitive differentiation, and the centrality of technological and data competencies inside these organisations, and as such is a further indication of the ascendancy of technology in the media industry (see Küng, 2017). For Netflix, first among equal of these technological processes are those involving data collection and analysis, and competitive performance is dependent on the quality of these. Core activities are data informed – from deciding which content to acquire or produce, to making creative decisions about that content, to setting prices, to ensuring an optimal match between subscribers and content.

The analysis points out that Netflix has characteristics of a network and of a platform. This applies to actors in three out of five core process stages the paper identifies (all but content providers and end users) are ‘platforms’ or multi-sided markets (Rochet & Tirole, 2003; Evans, Hagiu & Schmalensee, 2006; Gawer, 2014). Devices are platforms - Apple TV brings together users and many streaming services, an Android phone connects both service providers and app programmers with an audience. Service providers, connect end users with all kinds of internet services. Content delivery networks connect anyone with a popular web site or another service with a lot of traffic with their audiences also through traffic spikes.

There is ambiguity in establishing firm boundaries also. Despite its size, Netflix is surprisingly reliant on external partners and core processes. In the risk analysis section of its

2018 Annual Report Netflix delineates its reliance on cable, satellite and communications operators, on third-party CDNs, and on Amazon Web Services which ‘runs the vast majority of our computing’ (Netflix, 2018: 8). Indeed, each of the streaming organisations combines home-built and external elements in different ways, and the rationale is higher quality or reliability of service, and a desire not to have to bear the cost of developing their own infrastructure. This phenomenon is hard to interpret. It is an example of co-opetition (Brandenburger and Nalebuff, 1996), but also can be viewed as reflecting an industrywide shift towards using cloud computing and ‘software as-a-service’ (SaaS) for technology infrastructures. (Fox & Patterson, 2014)

Thus, while the temptation for those within the media sector is to evaluate these against existing categorisations of legacy players in the media industry, this paper finds that they are in fact ‘new beasts,’ echoing some aspects of Hesmondhalgh’s (2019) position. To analyse these players primarily in terms of their ‘difference’ to legacy competitors - the case of Netflix versus the national broadcast networks or movie studios – is to overlook critical dimensions of differentness and perhaps falsely categorise them. One example is the reliance on data collected in what we term the “data flow”. These data are a central part of Netflix’s value proposition and source of competitive advantage. In today’s increasingly digital media systems, it could be argued that all media organisations are making increasing use of user data to inform decisions, and regard this data as an important strategic asset, yet relatively few of these are organised in such a way that the ‘data flow’ is at the core of their operations, reflecting that legacy players have needed to retrofit data capture and analysis functions on to existing operations in a way that new players such as Netflix have not had to. By extension, while Netflix has one foot into the television and film industries, it has another in the data science industry, as does many of its co-opetitors such as Amazon or YouTube.

A final point concerns regulation. Scholarly discussion of the challenges these

players' tech-media hybrid status creates for regulatory and tax regimes is mentioned earlier in this paper. A conclusion to be drawn from this study is that to resolve these issues it may be necessary to adopt a non-binary approach. Streamed service providers are media nor tech but rather a new entity of organisation that cannot be easily accommodated inside existing definitions. Because of their disruptive potential for domestic content producers in national markets, and for national media systems, it is important to understand what they are and how they function. Streaming media providers are not subject to media content regulation in the same way as traditional media players, and indeed in the widest sense, regulatory structures have yet to adapt to these new entities – ensuring that not just media scholars but also media regulators and policy makers understand these new organisations, their role and their power, will be central to ensuring plurality in media systems, particularly at national level.

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Notes

¹ For the sake of clarity, we will treat Netflix as a television company and part of the television industry. That is a huge simplification, as a large part of its catalog is films, and as such, Netflix is also an important player in the film industry. However, as the focus of this

paper is the technology, we have simplified these industry descriptions.

² Details on the project is found on <https://bit.ly/streamproject>

³ This depiction builds on a representation by Scalescale (<https://www.scalescale.com/the-stack-behind-netflix-scaling/>), also incorporating elements from Popescu et.al (2018) and authors' own research.