

# The Pattern Level Development of Streaming Services



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## Abstract

This report critically investigates the evolution, functionality, and influential components of video streaming services, primarily focusing on Netflix due to its pioneering role and leading position in the industry. Starting with the inception of the internet, the study traces the journey of streaming services, underlining the importance of broadband internet, data compression techniques, and technological tools. It outlines how these platforms, through SVoD models, have redefined media consumption by providing tailored, immediate access to a vast library of content. The pivotal role of Content Delivery Networks, user interfaces, databases and algorithms are also explored. The report scrutinises Netflix's rise, its competitive strategies in the face of rivals like Amazon Prime Video and Disney+, and its efforts to tackle market saturation and competition. The transformation of the sector due to major film studios backing rival platforms and evolving technologies like cloud gaming and virtual reality are highlighted. The report underscores the importance of continuous innovation and adaptation in this rapidly evolving industry.

## Index

Abstract	1
1 Service Definition	3
1.1 Introduction	3
1.2 Service Description	3
1.3 Technological Principle and Functionality	3
1.4 Technological Components	4
2 Literature Research	5
3 Pattern of Development and Diffusion	5
3.1 Innovation Phase of Streaming Service	5
3.2 Introduction of Streaming Service	6
3.3 Market Adaption Phase	6
3.4 Large-scale Diffusion	7
3.5 Market Stabilization Phase	7
4 Analysis of Current Status of the Product	8
4.1 Current Status of the Product	8
4.2 Market Actors	9
4.3 Barriers to Large-scale Diffusion	9
4.4 Influencing Factors Stimulating Further Development	10
5 The Roles and Strategies of Actors	10
5.1 Strategies and Actors: The Innovation Phase	10
5.2 Strategies and Actors: The Market Adaptation Phase	11
5.3 Strategies and Actors: The Diffusion Phase	12
5.4 An Overview of the Strategy	13
6 Conclusion	14
Bibliography	15
Appendix	17
Appendix 1 – Literature Review	17
Appendix 2 – Pattern of development and diffusion streaming services	19
Appendix 3 – Possible barriers for large-scale diffusion	20

# 1 Service Definition

## 1.1 Introduction

Streaming services have changed the entire entertainment industry and in particular the way people consume videos and films. Buying films in video stores and visiting the cinema were popular activities in the 90s and zeros, but nowadays streaming services, with their opportunity to provide multiple films at home for a fixed amount of money, are taking over the industry. In this report the focus is on the pattern of development and diffusion of the radically high-tech service of streaming videos. First, the definition of the service and the unit of analysis are defined in chapter 1. Secondly, a thorough literature research is carried out in chapter 2, which is used to describe the pattern of development and diffusion over time supported by a comprehensive overview in chapter 3. In chapter 4, the current situation with associated actors and factors is analysed. Finally, chapter 5 explored the roles and strategies of actors in the development, adaption and commercialisation phase.

## 1.2 Service Description

The report is about streaming services in general, but focussed on the streaming of video content like TV shows and movies. So other streaming services in for example the music or gaming industry are not part of the research. Some well-known firms discussed in this report are Netflix, Amazon Prime Video and Disney+. Especially Netflix is frequently used as an example within the storyline of streaming services, because Netflix is considered as the first entrant in the business and the market leader at the moment (Edwards, 2022). The fact that Netflix was the first entrant and is still the market leader advocates for our use of Netflix as a main representative of the whole streaming services industry.

The starting point of the report is the advent of the internet in the 90s, because it sets the stage for development for streaming services. The growing relevance of the internet as a tool for entertainment in the following years leads to more interest and investigation in alternatives. The starting point of the whole analysis is 2007, the moment when Netflix added online streaming to their services (McFadden, 2020). In the same year, firms like Amazon and Hulu already started with providing similar services. This particular year is considered as the time of invention of streaming services, which is more than a decade later than the widespread use of the internet. So, the characteristics for the breakthrough of streaming services are the invention of Netflix to provide online streaming as service and the existence of multiple competitors.

The invention of online video streaming services is a breakthrough technology, because the invention fundamentally changes the dynamics of an existing industry and market (Nieminen, 2020). Nowadays, people watch a variety of movies at home for a monthly description instead of watching one new movie at the cinema. Furthermore, breakthrough services merge style, technology and value to provide the best fit for customers (Cagan & Vogel, 2001). The technology of streaming videos adds value for potential customers, because they could see as many movies as they like for a fixed price while staying at home. The next paragraphs show several technological principles, functionalities and technological components regarding to the video streaming services industry.

## 1.3 Technological Principle and Functionality

The service of streaming services is all about providing unlimited excess to a company's video library for a monthly or yearly subscription, also known as SVoD (Subscription based Video-on-Demand). Such a video library consists of video content like TV shows and movies made by entertaining companies or home-made content. Streaming services sell the access to this kind of content as a digital platform (Nagaraj, Singh, & Yasa, 2021). In addition, streaming services use real-time streaming via internet connection instead of required downloading to reduce waiting time for customers to a minimum but have also the option to download content in advance for situations without excess to internet connection (Haverkamp, 2023). So the main technological principles for streaming services are; providing

unlimited excess to videos, the creation of a digital platform and offering the possibility to use real-time streaming with internet connection and the option to download content.

The functionality for users depends on customer preferences. Streaming services do as much as possible to be a better fit for customers than for example television. In the first place, streaming services provide the opportunity to view customers' favourite movies or TV shows everywhere and at any time. No television guide needed anymore and no need for paying a ticket for the cinema, but a tailored customer based viewing experience. The customer based viewing experience is further emphasized by the possibility of global content and the additional features like lists for customers' favourite movies, adjustable playback speed and high video quality (Nagaraj, Singh, & Yasa, 2021). Furthermore, streaming services use algorithms to suggest the next activity for users based on their preferences and history, also known as recommender systems (Hasan, Jha, & Liu, 2018). Finally, another feature of streaming services is the possibility to use your account on other devices, even on the same time with a special family account (Nagaraj, Singh, & Yasa, 2021).

## 1.4 Technological Components

Streaming services rely on several components, which has its own innovation streams. Some components are invented before streaming services, some later in time. There are many subsystems and subservices involved, but only the main components are mentioned in this section.

### [1] *Content Delivery Networks*

A Content Delivery Network (CDN) is a globally distributed group of servers that caches video content close to end users. CDNs are used for the rapid transfer of assets needed for loading internet content. Nowadays, the majority of web traffic is already done with a CDN, and the popularity is still growing due to the fast response time and solid protection against hacker attacks (Cloudflare, 2023).

### [2] *Interactive User Interface*

A User Interface is the graphic display of the video content for the customers, in other words the online environment for users. The purpose of the user interface is showing a company's content in an efficient and attractive way to serve the customers. The video streaming industry benefits from an interactive user interface, because it needs to fit multiple devices such as mobile phones and televisions. Another key point is the user-friendliness of the user interface, because customers want what they need in the easiest way and within the shortest possible time (Waraich, 2023).

### [3] *Databases*

Huge industries like the video streaming industry have a lot of data. Databases are systems used to store all kind of data. Companies in the video streaming industry use a lot of databases in several ways. First of all, databases are used to store all the video content like movie titles. On the other hand, databases are also used for transaction purposes and billing. A third way of using databases is by storing all the data gathered from customers for data analysis purposes. Finally, also the information from inside the company like personnel data and data from finished projects are stored in databases (Waraich, 2023).

### [4] *Algorithms*

As soon as you open your streaming service app, the suggestions appear on your screen. Streaming services could suggest TV shows and movies aligning with personal preferences based on the analysis of algorithms. A source for the analysis is the enormous database of (personal) information, gathered from data and history of all kind of users. Data and algorithms help streaming services to provide customer based services, which leads to more customers (NOS Nieuws, 2018).



## 2 Literature Research

Firstly, an extensive examination of the theme of streaming services was conducted by analyzing financial institutions, journalistic sources, and relevant industry research reports. In investigating the typical processes of technological innovation and dissemination within the streaming field, both the Google Scholar search engine and the ScienceDirect database were employed as primary research tools to gather academic literature. A chronological approach was adopted to provide a coherent and logically structured overview of the streaming services' developmental trajectory, subdividing the progression into six defined stages: Pre-invention, Invention, Innovation Phase, Adaptation Phase, Large-scale Diffusion, and Market Stabilization Phase. Specific search terms such as "The early stage," "Invention," "Development," "Rise," and "Status quo of streaming service" were utilized to refine the research focus. This method emphasized key events or hallmarks, leading to a detailed account of the entire developmental continuum of streaming services consolidated in a structured table (refer to Appendix A). An in-depth review of article abstracts and a correlation with the designated search keywords facilitated the categorization of literature according to respective stages, contributing to an enriched analysis of the Pattern of Development and Diffusion of streaming services, as addressed in the third section.

Streaming service technology has emerged as a consequential product of the evolution of Internet technology, embodying a complicated combination of diverse factors such as technological parameters, consumer demands, and the prevailing landscape of related industries. This article selects Netflix, a leading streaming services company, as a major analysis object. Its stock price performance can be a highly insightful indicator reflecting the performance of the streaming market. Following a comprehensive review of the historical trajectory of streaming technology development, the study reveals that Netflix's ascent within this domain cannot be characterized as pioneering. Instead, Netflix's rise is based on previous technology accumulation and a shift in market demand. Initially, advanced media players such as RealPlayer and Adobe Flash Player laid the foundation for promoting streaming technology. With the development of technology, streaming platforms gradually extended from PCs to televisions and other devices, with smart TVs and game consoles beginning to play a critical role in this transition. To facilitate a multifaceted comprehension of the streaming service technology's current paradigm, this study extends beyond Netflix, encompassing the analysis of formidable competitors, including HBO and Amazon Prime. Such a broad approach is indispensable to articulate a nuanced understanding of the current developmental trends and prospects that delineate the streaming service technology landscape.

## 3 Pattern of Development and Diffusion

This section conducts an in-depth analysis of the evolution and growth of streaming services, using the transformative journey of Netflix as an example. The discussion traces the technological advancements that enabled streaming services. It continues with an invention of the streaming technology, market adaptation, large-scale diffusion phase, and market stabilization phase and the impact of the COVID-19 pandemic on viewership. Additionally, the section delves into the looming crisis of content saturation and discusses how it might reshape the future of the streaming media industry. The overview of the pattern of development and diffusion for streaming services is shown in appendix 2.

### 3.1 Innovation Phase of Streaming Service

Streaming is commonly understood as the technique of compressing continuous video and audio data, placing it on a web server, and allowing users to view or listen to it concurrently with downloading. This eliminates the need to wait for the entire compressed file to download before viewing or listening. The advent of streaming services can be attributed to the following foundational technologies:

[1] Broadband Internet and Consumer Hardware: The proliferation of broadband internet facilitated the high-speed transmission of substantial data volumes, including video and audio (Leiner, 2009). Coupled

with the emergence of powerful personal computers and laptops, capable of processing and rendering high-quality video content, this technological advancement enabled streaming services to cater to a broad audience.

[2] Content Delivery Networks (CDNs) and Data Compression Techniques: CDNs, comprising networks of servers strategically distributed across various geographical locations, have been instrumental in delivering content to users efficiently (Meier, 2011). This, along with video encoding and decoding technologies such as H.264, allowed for high-quality video to be compressed, transmitted, and then decompressed for viewing.

The convergence of these technological innovations has not only made streaming services feasible but has also contributed to their widespread adoption and success. The continuous evolution of these underlying technologies promises to shape the future landscape of streaming, offering new possibilities and challenges.

### 3.2 Introduction of Streaming Service

The invention of streaming services can be traced back to the 1990s, with a notable milestone being the first video stream of a band performance by Severe Tire Damage in 1991 (STD, 1995). Remarkably, this streaming event consumed nearly half of the internet's bandwidth at that time.

By 1995, the introduction of the Real-Time Transport Protocol (RTP) (Perkins, 2003) marked a significant advancement, becoming a standardized packet format for delivering audio and video over IP networks. In the mid-1990s, Progressive Networks, which was later renamed RealNetworks, launched RealAudio, the first streaming audio platform. This innovation was followed by the introduction of RealVideo (Realnetworks, 1996) in 1997. Microsoft also made significant strides in the field, introducing NetShow in 1997 and solidifying Windows Media Player (Microsoft, 1997) as a key player in the streaming market by 1999.

These early developments laid the foundation for subsequent streaming technologies, encompassing various protocols, codecs, and player software. The emergence of streaming audio and video began to shift consumer behavior towards online media consumption, paving the way for the digital media landscape we know today. Early commercial efforts, including the pioneering work by RealNetworks and Microsoft, set the stage for the diverse array of advertising-supported and subscription-based streaming services that have since become integral to modern entertainment and communication.

### 3.3 Market Adaption Phase

The market adaptation phase of streaming technology occurred during the late 1990s to early 2000s, a time marked by significant technological advancements and commercialization. RealNetworks pioneered live video streaming, with the broadcast of a baseball game in 1995 serving as a milestone (REID, 1997). Increased access to computer networks and the Internet, along with advances in data compression, facilitated the streaming of audio and video content to users in homes and workplaces. The late 90s also saw an infusion of investment into the sector, with businesses launching streaming video archives for promotional purposes.

The impact of these developments was profound, making streaming more accessible to the general public and leading to early adoption by businesses and consumers. The emergence of streaming platforms like RealPlayer and Windows Media Player integrated streaming into websites and began the commercialization of streaming content. This period also saw the rise of live streaming and on-demand streaming, transforming the way people consumed media. The interactivity of the web and the ability to collect data and feedback made streaming technology gain momentum quickly.

However, the market adaptation phase was not without challenges. Bandwidth requirements, compatibility issues, and competition between different streaming formats required users to download

multiple applications for compatibility. Despite these challenges, this stage laid the foundation for the large-scale diffusion and market stabilization phases that followed, setting the stage for the modern streaming landscape. The integration of streaming into commercial and personal use during this phase has had a lasting impact on media consumption, influencing the way content is delivered and consumed today.

### 3.4 Large-scale Diffusion

The large-scale diffusion phase of streaming technology began in the mid-2000s, driven by improvements in data speeds and reduced broadband costs. This era saw the birth of first-generation video streaming services. A group of ex-PayPal employees founded YouTube in 2005, leading to an explosion in video streaming (Hosch, 2023). Recognizing the potential, Netflix transitioned from a DVD rental company to an internet-based streaming service (Netflix, 2022). Google's acquisition of YouTube for \$1.65 billion in 2006 signaled the market's potential for spectacular growth.

This phase marked a turning point in media consumption, Amazon Prime Video service is added as a benefit for Amazon Prime members early in 2006, however it become a mature streaming service in the early 2010s (Wayne, 2018). While other competitors like Hulu, Disney+ and HBO+ emerge and withdraw steaming rights from Netflix from 2018 (shown in Table 1), segmenting the user market. The growth of mobile streaming and the maturation of recommendation systems further fueled the expansion of streaming services. The large-scale diffusion of streaming technology set the stage for a new era of entertainment, transforming how content was accessed and consumed globally.

*Table 1: Average Subscriber of Main Streaming services providers*

Average Membership	2018	2019	2020	2021	2022
Netflix	124.7	153.0	189.1	210.7	222.9
PrimeVideo	125	150	200	203.9	208
Disney+	/	/	33.5	103.6	137.7
Apple TV+	/	/	33.6	40	47.6
HBO Max	/	/	53.8	63.9	76.8
Paramount+	/	4	8	32.8	55.9
Hulu	20.1	23.2	28.8	37.7	41.4

Take Netflix's global expansion strategy as an example. By 2022, Netflix was operating in over 190 countries, with nearly 156 million of its 230 million subscribers outside the U.S. The company's success in international markets can be attributed to its gradual expansion, starting first in countries similar to its U.S. home market, and then adapting to local cultures and preferences. By 2015, it had entered 50 countries, and in the second quarter of 2018, its international streaming revenues exceeded domestic revenues for the first time.

The COVID-19 pandemic led to lockdowns affecting another large-scale diffusion globally, prompting approximately a 10% surge in viewership for online video streaming services (Grandview, 2022). Consequently, platforms including YouTube, Amazon Prime Video, Netflix, and Disney+ experienced worldwide spikes in viewership. With series like "Squid Game" and "Don't look up" gaining massive popularity, for example Netflix's global paid streaming service added 4.38 million subscribers in 2021 Q3, surpassing analysts' expectations and showing strong growth compared to the same period last year when it added 2.2 million subscribers and switch the subscriber growth point to the Asia area.

### 3.5 Market Stabilization Phase

The large-scale diffusion phase of a technology or service refers to the period during which it becomes widely adopted across a broad segment of the population. The end of the pandemic is a representing



milestone for the begin of market stabilization. Another industrial sign is the sharp drop of Netflix's stock price due to unmet membership growth expectations. Market saturation of streaming market became a prominent issue, with 75 million out of 142 million households in the U.S. and Canada already subscribed to Netflix. In markets like India and Africa, users are still increasing however price sensitivity presented hurdles, leading stream service provider to adopt a new pricing strategy involving advertising.

The saturation of content also became a concern, with an overwhelming amount of content being released simultaneously, making it nearly impossible for audiences to keep up. Since the onset of the Covid pandemic, many places are reverting to pre-pandemic norms. Young people are reclaiming the outdoors, resulting in less screen time and exacerbating the oversaturation of streaming content.

In conclusion, the market stabilization phase has seen increased competition, market saturation, and a focus on original content and exclusivity. Challenges such as content oversaturation and changing consumer behaviors have shaped the industry, leading to new business models and strategies. The streaming market is increasingly resembling a zero-sum game, reflecting a mature and highly competitive landscape.

Figure 1 provides the overview for the pattern of development and diffusion in an evolutionary model. The major points from the text are analysed and combined in the diagram below. This diagram shows several phases and milestones corresponding the evolutionary model: The innovation phase, market introduction, adaptation phase, large-scale diffusion and the market stabilization phase (Ortt, 2009).

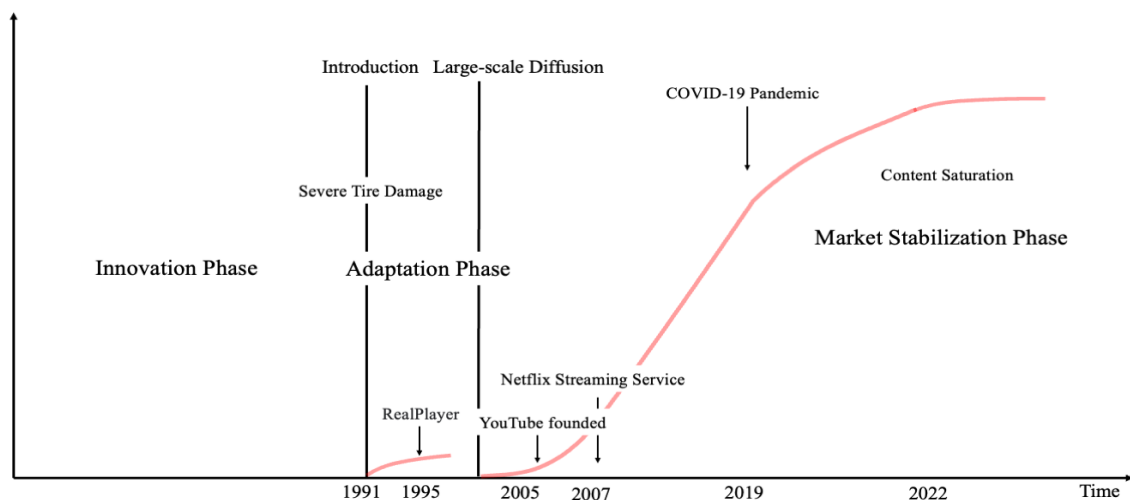


Figure 1: Pattern of development and diffusion of streaming services

## 4 Analysis of Current Status of the Product

In this section, The current status of streaming services will be analysed, with a focus on the prominent player Netflix. The global adoption of video streaming services will be examined and the main market actors shaping the streaming industry will be identified. To execute this analysis, a barrier framework by Ortt, which provides a list of (influencing) factors who describe possible barriers to large-scale diffusion, is used (see appendix 3).

### 4.1 Current Status of the Product

Streaming services have revolutionised the way we consume media, with Netflix emerging as a prominent player. The global adoption of streaming services has witnessed exponential growth, driven

by factors such as product performance and quality, as well as product price. Product performance and quality are crucial factors for large-scale diffusion. Customers require a streaming service with good performance and high-quality content. If the performance is lacking or the content quality is low, it can hinder widespread adoption. Similarly, product price plays a significant role. Customers expect a reasonable price compared to other offerings. If the price is prohibitively high, it can hamper the diffusion of streaming services.

## 4.2 Market Actors

Content creators and production studios play a crucial role in providing engaging and diverse content for streaming platforms like Netflix.

Content creators contribute to the development and diffusion of streaming services by producing content that drives the popularity and adoption of platforms. Engaging and diverse content is essential for large-scale diffusion.

Production studios collaborate with streaming platforms to deliver high-quality shows and movies. A robust production system capable of producing content with good performance and quality is necessary for large-scale diffusion. If there is a lack of a production system or unintended side-effects of production, it can hinder the diffusion of streaming services.

## 4.3 Barriers to Large-scale Diffusion

When evaluating the current status of streaming services, we can observe that certain factors are acting as barriers to their large-scale diffusion, while others are not significantly impeding their expansion. Below, we dissect these factors based on the Ortt framework (see appendix 3):

### Product Performance and Quality

For streaming services like Netflix, product performance and content quality are paramount. The current status indicates that most major streaming platforms offer high-quality streaming with minimal disruptions. Content is produced and delivered efficiently, meeting the performance expectations of users. Thus, this factor is not a significant barrier to large-scale diffusion.

### Product Price

Affordability plays a vital role in the diffusion of streaming services. Presently, the pricing models offered by streaming platforms are diverse, with options for different budget ranges. While some premium services exist, cost-effective alternatives are available, making it accessible to a wide range of users. Thus, high pricing is not a substantial barrier.

### Production System

Streaming services rely on robust production systems to create and deliver content. Major platforms have established efficient content production processes, ensuring a steady flow of new material. This factor is not a significant hindrance to large-scale diffusion.

### Complementary Products and Services

Streaming platforms depend on complementary products and services, such as internet infrastructure and compatible devices. The current status indicates that these components are generally in place. Internet connectivity has improved in many regions, and streaming-compatible devices are widely accessible. These factors are not posing substantial barriers.

### Network Formation and Coordination

Large-scale diffusion requires coordination among various actors involved in content creation, distribution, and maintenance. The streaming industry has established effective coordination mechanisms, both implicit (market-driven) and explicit (industry associations). These mechanisms facilitate the industry's smooth operation, and network formation is not a major barrier.

### Customers

Customers are integral to the success of streaming services. Presently, the market has a substantial user base with a growing appetite for streaming content. Customers are knowledgeable about the services, willing to use them, and able to pay for subscriptions. Thus, customer-related barriers are relatively minimal.

### Specific Institutional Aspects:

Regulations and policies surrounding content licensing and copyright can either facilitate or hinder streaming services. While there are variations in regulations across regions, streaming platforms have largely navigated these challenges through negotiations and agreements. Specific institutional aspects pose some barriers but are not insurmountable.

## 4.4 Influencing Factors Stimulating Further Development

### Socio-Cultural Aspects

Streaming services are deeply intertwined with socio-cultural aspects, particularly shifting consumer preferences. The rising demand for on-demand and personalized content consumption mirrors evolving socio-cultural inclinations. Modern consumers, especially the younger generation, seek flexibility and control over their entertainment choices. This aligns seamlessly with streaming platforms' capacity to offer an extensive content library accessible anytime and on various devices.

### Knowledge and Awareness of Technology:

The growth of streaming services hinges on technological advancements. As consumers demand higher-quality content and smoother streaming experiences, platforms must leverage cutting-edge technology to satisfy these expectations. Awareness of technological trends and adaptability to them are paramount. For instance, the adoption of adaptive streaming technology enables platforms to optimize streaming quality based on users' internet speeds, bridging the divide between technology and user satisfaction.

### Accidents or Events

The COVID-19 pandemic, one of the most significant global events in recent memory, has exerted a unique impact on the large-scale diffusion of streaming services. The pandemic's lockdowns and social distancing measures compelled people to stay home, resulting in a surge in demand for home entertainment. Streaming services emerged as the primary source of entertainment during this period, benefiting significantly.

The unexpected onset of the COVID-19 pandemic underscored the interplay between socio-cultural aspects and technological awareness. During the pandemic, this intersection became clear. Lockdowns and social distancing measures magnified the need for home entertainment, reflecting evolving socio-cultural preferences for on-demand content. Simultaneously, the technological infrastructure of streaming services, built upon advancements, was primed to meet the heightened demand.

In essence, the pandemic intensified the relationship between changing consumer preferences and technological readiness. Streaming services, equipped with technology to provide personalized and high-quality content, were well-suited to thrive in a world where socio-cultural factors favoured at-home entertainment.

## 5 The Roles and Strategies of Actors

### 5.1 Strategies and Actors: The Innovation Phase

In this part we have a deeper look at the different actors in the innovation phase and analysing their strategy. Since Netflix is considered as the disruptor, we mainly analyse their strategy. When competition increases, the competitors come into the picture and focus switches to the strategy of streaming services in general. Netflix started as a DVD-by-mail rental service in 1997, they grew to become the world's largest streaming service – using 11.4% of the total global downstream traffic in 2019 (Edwards, 2022).

### 5.1.1 Reed Hastings and Marc Randolph: The Founders

Having experienced the inconvenience and exorbitant late fees of the traditional video rental industry, Reed Hastings and Marc Randolph pursued to create an alternative. Their shared vision led to the establishment of Netflix, an online movie rental service, offering a flat-fee subscription for DVD rentals by mail. Reed Hastings, with a background in tech (*receiving an MSCS in AI from Stanford University*) and having previously founded a software company, provided the technological expertise, while Randolph, with marketing experience, shaped the brand's image and customer approach. The strategy of the founders aimed to leverage the increasing potential of the Internet to disrupt the movie rental market. They employed a no-late-fees policy and implemented a recommendation algorithm to personalize users' experiences, positioning Netflix as a customer-centric alternative to traditional video rental stores (McFadden, 2020).

### 5.1.2 Blockbuster: The Competitor

Blockbuster was the dominant player in the movie rental industry when Netflix arrived. Initially, the company did not perceive Netflix as a significant threat (they [CEO Blockbuster] even “*smiled and laughed*” at Reed Hasting when he approached Blockbuster about a partnership (McFadden, 2020)), choosing to focus on their physical rental business instead, since it resulted in exorbitant profits. Blockbuster was slow to adapt to the shift towards online rentals. It wasn't until 2004 that they launched an online rental service to rival Netflix, but it was too late. Blockbuster's complacency and failure to anticipate the potential of online rentals allowed Netflix to gain a significant market share. Eventually, in 2010 Blockbuster filed for bankruptcy.

### 5.1.3 Customers: The Disruptors

The customers, accustomed to the traditional in-store rental model, initially had to adapt to the new online rental process introduced by Netflix. However, the convenience of home delivery, the extensive movie selection, and the elimination of late fees made Netflix an attractive option. Therefore, customers played an integral role in the disruptive innovation process. They adopted the new model and began shifting their preferences from physical stores to the online platform, effectively driving the disruption.

### 5.1.4 Investors: The Risk Takers

In the early days of Netflix, investors played a crucial role. With technology stocks still recovering from the dot-com bubble, investing in an online DVD rental startup was a significant risk (McFadden, 2020). Despite the risk, some investors saw the potential in Netflix's unique business model. Their financial support allowed Netflix to weather initial challenges, acquire a larger movie catalogue and invest in improving their recommendation algorithm.

## 5.2 Strategies and Actors: The Market Adaptation Phase

Early adopters played a fundamental role in Netflix's market adaptation phase. Willing to shift away from traditional rental stores and appreciated the benefits of the online rental model early-on. These initial customers not only served as word-of-mouth promoters, encouraging Netflix's growth, but their feedback also proved unique in refining the services and tailoring its offerings to meet preferences.

To fulfil its promise of providing an extensive movie library, Netflix heavily relied on content from movie studios (*complementary goods*). This required negotiations to secure distribution rights for a vast array of films. The company focused on establishing mutually beneficial relationships with studios, offering them an alternative revenue stream while broadening their audience reach.

Investors were instrumental during Netflix's market adaptation phase, as they provided the necessary funding to expand the movie catalogue, enhance the recommendation algorithm, and support national growth. Netflix attracted these investors by demonstrating the viability and profitability of their unique

business model. This investment allowed Netflix to scale up, setting the stage for its future dominance of the rental market.

As the company navigated the market adaptation phase, Netflix's strategic foresight led to a significant shift in its business model. Recognising the importance of differentiation in an increasingly competitive landscape, Netflix invested in producing original content – “*House of Cards*” as the first original show. In a period of 12 months (2017-2018) they spend more than 10 billion dollar developing new content – *spend money to make money* (Gibbons, 2019). This new strategy, combined with their clear vision and innovative approach, allowed Netflix to effectively carve out its niche and establish itself as a leading entertainment service, revolutionising the way we consume media. In conclusion, the main strategies for the market adaptation phase – increase of installed base – are (1) *Use of word-to-mouth promoters*, (2) *Use of complementary goods*, (3) *Creating exclusive content* and (4) *Attract investors*.

### 5.3 Strategies and Actors: The Diffusion Phase

The business model of Netflix had proven successful. Netflix was no longer a niche service for early adopters, but a mainstream contender. They pursued a more aggressive marketing campaigns to increase visibility and continued to evolve there platform. Creating a state-of-the-art recommendation system by improving there algorithms and make use of (and sell) the gathered data. Instead of only operating in the US, Netflix also broaden their borders Expanding their market in 2014, launching in six new countries in Europe (McFadden, 2020).

During the diffusion phase, mainstream customers became key actors. These were the late majority who had initially hesitated to adopt the online rental model but were now ready to embrace it due to its growing popularity and proven benefits. Netflix focused on making their platform even more accessible and user-friendly to attract these customers. They continued to grow their library and ensuring there was something for everyone, regardless of their tastes.

As Netflix's growth skyrocketed during the diffusion phase, shareholders became increasingly important. Their belief in the company's vision and potential was crucial for funding continued expansion and innovation. Netflix worked to continually deliver value to its shareholders through consistent growth and profitability. This was achieved by focusing on user acquisition, retention, and diversification of revenue streams, like original content production. The main focus of the strategy within the diffusion phase is (1) *Expanding their available content – for the customers* and (2) *Consistent growth and profitability – for the shareholders*.

#### 5.3.1 A Competitive Market

As Netflix began to gain traction, other companies took notice and entered the online rental and streaming market. Some of the competitors have a similar strategy and others differentiate themselves. To gain more insight in and compare the strategy of the companies a SWOT-analysis is conducted and the results are presented in table 2.

[1] *Amazon Prime Video: The Retailer's Advantage:* Amazon Prime Video leveraged its position within Amazon's broader ecosystem of services. Amazon pursued a similar strategy to Netflix, investing in original content. They also differentiated themselves by acquiring rights to stream live sports events and by offering a subscription model where users could subscribe to other channels and services.

[2] *Disney+: The Content Behemoth:* Disney leveraged its vast content library to compete in the streaming wars. Launching Disney+ in 2019, they took advantage of their ownership of beloved franchises like Marvel, Star Wars, and Pixar. They also removed their content from other platforms to exclusively stream on Disney+, forcing dedicated fans of their franchises to subscribe.

[3] *HBO Max: The Premium Content Provider:* HBO, a premium cable network, entered the streaming race with HBO Max in 2020. They used their reputation for high-quality, award-winning



content to differentiate themselves. HBO Max included all of HBO's content, as well as additional shows, movies, and exclusives from other Warner Media properties. In response to the pandemic and the closure of movie theatres, HBO Max made a ground-breaking move by deciding to release all of Warner Bros. 2021 movies on HBO Max the same day they hit theatres. This dual release strategy was a direct adaptation to the prevailing market context.

Table 2: SWOT analysis of the competitive market of streaming services

	Netflix	Amazon Prime Video	Disney +	HBO Max
Strength	<ul style="list-style-type: none"> <li>- Innovative</li> <li>- Personalised</li> <li>- Extensive content</li> </ul>	<ul style="list-style-type: none"> <li>- Integrated in Amazon's ecosystem</li> <li>- Live sport</li> </ul>	<ul style="list-style-type: none"> <li>- Ownership of popular franchises</li> <li>- Exclusive Disney content</li> </ul>	<ul style="list-style-type: none"> <li>- High quality award winning content</li> </ul>
Weakness	<ul style="list-style-type: none"> <li>- Dependent on subscriber growth</li> <li>- Heavy spending on content</li> </ul>	<ul style="list-style-type: none"> <li>- Supplementary service to Amazon's primary offerings</li> </ul>	<ul style="list-style-type: none"> <li>- Limited content (Disney owned)</li> <li>- Lack of variety</li> </ul>	<ul style="list-style-type: none"> <li>- Limited audience due to premium content focus</li> </ul>
Opportunities	<ul style="list-style-type: none"> <li>- Expanding international markets</li> <li>- Diversifying content (e.g. gaming)</li> </ul>	<ul style="list-style-type: none"> <li>- Further integration with Amazon services</li> <li>- Expansion live sports</li> </ul>	<ul style="list-style-type: none"> <li>- Leverage other Disney services (theme park)</li> </ul>	<ul style="list-style-type: none"> <li>- Explore exclusive partnerships</li> </ul>
Threats	<ul style="list-style-type: none"> <li>- Competition in streaming market</li> <li>- Saturation primary markets</li> </ul>	<ul style="list-style-type: none"> <li>- Dependence on Amazon's ecosystem</li> <li>- Competition with other sport streaming</li> </ul>	<ul style="list-style-type: none"> <li>- Over- reliance on existing franchises</li> </ul>	<ul style="list-style-type: none"> <li>- Limited content sticking to premium theme</li> </ul>

### 5.3.2 The Impact of Covid-19

During the Covid-19 pandemic, streaming services, especially Netflix, experienced significant growth. Netflix added over 26 million subscribers in the first half of 2020, surpassing Wall Street's estimates and their own forecasts. The platform was a popular choice for home entertainment during lockdowns, with adults in the UK spending 40% of their waking hours watching screens (ACCA, 2022). Netflix holds a dominant position in the market with 200 million subscribers worldwide, maintaining its rank through continuous fresh content, despite Covid-related production restrictions. They also adopted big data analytics and cloud storage to enhance content creation and user experience. Despite some financial controversy and slightly decreased Q3 growth, Netflix continues to expand its reach, even experimenting with real-time scheduled programming (ACCA, 2022).

## 5.4 An Overview of the Strategy

In the landscape of digital streaming, Netflix' vision to disrupt the traditional movie rental space, has displayed strategic agility across three distinct phases: innovation, market adaptation, and diffusion. Beginning as a DVD-by-mail service that capitalised on the internet's increasing potential, it outmanoeuvred companies like Blockbuster due to its pioneering approach and customer-first policies. The market adaptation phase witnessed Netflix leaning into word-of-mouth promotion, fostering relationships with movie studios, producing original content, and courting investors. Upon reaching the diffusion phase, Netflix shifted from a niche preference to an aggressively marketing offerings and

expanding globally. This dominance incited competition, with giants like Amazon Prime Video, Disney+, and HBO Max, each carving their niches with distinct strategies. Notably, the COVID-19 pandemic supercharged streaming's relevance, with Netflix experiencing a surge in subscribers and maintaining its leadership by leveraging big data and innovative content strategies.

## 6 Conclusion

This report studied the pattern of development and diffusion of the radically high-tech service of streaming videos. The starting point is the advent of the internet in the 90s and the growing relevance as a tool for entertainment. Netflix, being the first entrants of the market, added online streaming to their services in 2007 and within the same year more competitors followed. That particular year is therefore the time of invention.

Streaming services are all about providing unlimited excess to a library of TV shows and movies for a monthly or yearly subscription. On the one hand, they sell excess to a platform with videos, while on the other hand they also sell home-made content. The functionality of streaming services is based on customer preferences with features like global content, a list with customers' favourite movies, adjustable playback speed, high video quality and suggestions for the next activity. Technological components on which streaming services depends are Content Delivery Networks, the user interface, databases and algorithms.

The development and diffusion analysis started with a timeline, made with information from a thorough literature study based on companies annual reports, interviews and scientific papers. Netflix emerged as the first entrants, because they changed their early business model of DVD-by-mail into an online streaming service. Netflix is still the market leader, but the installed base of competitors like PrimeVideo and Disney+ is growing fast over the last five years. Another point of interest is the Covid pandemic, because video streaming services in general had 10% surge in viewership. After Covid, the streaming services market saturated and market fragmentation appeared due to the high number of members and the growing competition. Netflix uses a penetration in lower-end markets like India and Africa as a strategy to increase the number of memberships and enter a new market. Nowadays, 80% of their new members are from those lower-end markets.

Analysing the current status of streaming services and market actors reveals a diffused but still dynamic and rapidly evolving industry. Key factors such as product performance and quality, product price, complementary goods, customers and technological advancements are critical for overcoming barriers and driving the development and diffusion of streaming services. Focusing on these relevant factors provides insights into the industry's dynamics and potential for future growth.

The key actors, based on Netflix's journey, – founders, customers, investors, and competitors – played significant roles in the development and diffusion of this radically new product. The founders of Netflix disrupted the traditional rental market, while customers drove the disruption by adopting this new model. Investors took risks to support Netflix's growth, and competitors contributed to shaping the market context. Netflix's strategies were a combination of anticipating market trends and influencing the market itself. They prioritised customer-centric approaches, developed advanced algorithms, and saw the potential of online streaming before others. In response to a competitive market, Netflix ventured into original content (Netflix Originals like *House of Cards*), set itself apart, and solidified its dominance.

The future will inevitably bring new challenges and opportunities. The streaming market is more competitive than ever, but Netflix's strong position, continuous innovation, and understanding of customer preferences make it a formidable player. The rise of new technologies and changing viewing habits will shape the industry, and Netflix's ability to anticipate and adapt to these trends will determine its ongoing success.

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## Appendix

### Appendix 1 – Literature Review



## Key Article

## Phase of Diffusion

## Searching Process

	Pre-Invention	Invention	Innovation Phase	Adaptation Phase	Industrial Production and Large-scale Diffusion	Market Stabilization Phase	Database	Searched Term	Searched Process
<i>(Leiner, 2009)</i>	X						Google Scholar	'Early stage of streaming service'	Looking for a term
<i>(Joni, 2016)</i>	X	X					Google Scholar	'Early stage of streaming service'	Looking for a term
<i>(Singh, 2011)</i>		X	X				Google Scholar	'Early stage of streaming service'	Looking for a term
<i>(Taylor, 2021)</i>		X	X	X	X		Science Direct	'Invention of streaming service'	Looking for Journals & books
<i>(Hasan M. R., 2018)</i>				X	X	X	Science Direct	'Invention of streaming service'	Looking for Journals & books
<i>(Sun, 2007)</i>		X	X	X			Google Scholar	'Development of streaming service'	Looking for a term
<i>(Times, 2007)</i>		X	X				New York Times	'Streaming service'	Looking for a term
<i>(Cunningham, 2013)</i>				X	X		Google Scholar	'Rise of streaming service'	Looking for a term
<i>(Hesmondhalgh, 2019)</i>			X	X	X		Google Scholar	'Rise of streaming service'	Looking for a term
<i>(Osur, 2016)</i>		X	X	X	X	X	Google Scholar	'Status quo of streaming service'	Looking for a term

## Appendix 2 – Pattern of development and diffusion streaming services

Date	Description and Characteristics	Main Actors	Source
Early 1990s	The advent of the internet and the widespread adoption of broadband set the stage for the future development of streaming services.	Various Telecom and Internet Service Providers	(Leiner, 2023)
1991	first video stream of a band performance by Severe Tire Damage in 1991	Severe Tire Damage	(STD, 1995)
1995	RealPlayer launched as the first mainstream media streaming product. It used a progressive download feature, allowing users to play media while it was being downloaded.	RealNetworks	(The History of RealPlayer, 2016)
1996	Adobe Flash Player was launched, playing a pivotal role in the early internet days. It enabled the playback of audio, video, and multimedia content within web browsers.	FutureWave Software, Macromedia, Adobe Systems	(Singh & Davids, 2011)
1997	Netflix was founded as a DVD-by-mail service.	Netflix	(Netflix, 2023)
Early 2000s	The development of more advanced data compression techniques (like H.264) and content delivery networks (CDNs) improved the feasibility and performance of streaming video.	Various tech companies	(Sun et al., 2007)
2007	Netflix introduced streaming services to its existing DVD-by-mail service. The streaming was made possible by Flash Player. It marked the first introduction of on-demand streaming of TV shows and movies to the market.	Netflix	(New York Times, 2007)
2007 onwards	Other players, like Amazon and Hulu, began to offer streaming services, marking the start of large-scale industrial production and the spread of streaming technology.	Amazon, Hulu	(Cunningham & Silver, 2013; Hulu, 2023)
2008 onwards	As the proliferation of smart devices, gaming consoles, and eventually smart TVs took place, streaming platforms began to develop apps for these devices, making streaming services more accessible.	Various tech companies, including Microsoft, Samsung, Sony	(Hesmondhalgh & Lobato, 2019)
2012 to present	There is a significant increase in the production of original content by streaming platforms, transforming them from pure service providers to major players in the entertainment industry. <sup>1</sup>	Netflix, Amazon Prime, Hulu, Disney+, etc.	(Osir, 2016)

### Appendix 3 – Possible barriers for large-scale diffusion

Core factors	Description	References
1 Product performance and quality	A product (with all subsystems, features, software and components) is required with a sufficiently good performance and quality (absolutely or relatively compared to other competitive products). Lacking performance, low quality, unintended side-effects of products or accidents with products can hamper large-scale diffusion.	(Kemp <i>et al.</i> , 1998) (Malerba, 2002) (Sahal, 1981)
2 Product price	The price of a product involves financial and non-financial (e.g. time and effort) investment to acquire and use the product. A product (with all subsystems, features and components) is required with a reasonable price (absolutely or relatively compared to other competitive products). A prohibitively high price can hamper large-scale diffusion.	(Kemp <i>et al.</i> , 1998) (Negro <i>et al.</i> , 2012) Tsoutsos and Stamboulis, 2005)
3 Production system	A production system that can produce large quantities of products with sufficiently good performance and quality (either absolutely or relatively compared to competitive products), is required for large-scale diffusion. A lack of a production system, unintended side-effects of production or accidents in production, can hamper large-scale diffusion.	(Kemp <i>et al.</i> , 1998)
4 Complementary products and services	Complementary products and services for the development, production, distribution, adoption, use, repair, maintenance and obsolesce of products are required for large-scale diffusion. Unavailable system elements (or incompatibility of them), unintended side-effects of complementary products and services or accidents, can hamper large-scale diffusion.	(Kemp <i>et al.</i> , 1998) (Geels, 2004) (Malerba, 2002)
5 Network formation and coordination	Availability of required actors and sufficient coordination of their activities to develop, produce, distribute, repair, maintain and obsolesce products as required for large-scale diffusion. Coordination can be emergent and implicit (e.g., the invisible hand or market mechanism) or can be formal and explicit (e.g., an industry association). If types of actors and coordination among these actors are needed yet missing, large-scale diffusion is hampered.	(Kemp <i>et al.</i> , 1998) (Edquist, 2011) (Malerba, 2002)
6 Customers	Customer segments are required for large-scale diffusion. Customers need to be knowledgeable about the product and its use, and should be willing and able to use it and pay for it. If customers are lacking, large-scale diffusion is hampered.	(Kemp <i>et al.</i> , 1998) (Malerba, 2002) (Ortt <i>et al.</i> , 2013) (Kamp <i>et al.</i> , 2004) (Geels, 2004)
7 Specific institutional aspects	The specific institutional aspects refer to formal policies, laws and regulations either describing norms and requirements regarding the product, production facilities, and complementary products and services or describing how actors (on the supply and demand side of the market) should deal with the product and system around it. Specific institutional aspects can stimulate or hamper large-scale diffusion.	(Kemp <i>et al.</i> , 1998) (Ortt & Egyedi, 2014) (Geels, 2004) (Malerba, 2002) (Bergek <i>et al.</i> , 2008)

Factors	Description	References
1 Knowledge and awareness of technology	Combination of fundamental and applied technological knowledge. Fundamental knowledge refers to the technological principles involved in the product, production and complementary products and services, and the surrounding socio-technical system. Applied technological knowledge refers to the knowledge required to develop (design), produce, and control the technological principles in a product, its production and complementary products and services. When relevant actors lack these types of knowledge, large-scale diffusion will be hampered.	(Kemp <i>et al.</i> , 1998) (Bergek <i>et al.</i> , 2008) (Edquist, 2011) (Geels, 2004) (Malerba, 2002)
2 Knowledge and awareness of application and market	This knowledge refers to knowledge of (1) potential applications, (2) knowledge of the market (structure) and the actors involved. This knowledge is required for all actors including customers to formulate strategies, articulate product requirements and find or target other actors. When relevant actors lack these types knowledge, large-scale diffusion will be hampered.	(Bergek <i>et al.</i> , 2008) (Kamp <i>et al.</i> , 2004) (Ortt <i>et al.</i> , 2013)
3 Natural and human resources	The availability of human resources with the required skills and knowledge, and the availability of natural resources, and other inputs, such as components and materials, is required to produce and use a new high-tech product. These inputs can be required for the production system, for complementary products and services, or for the product itself. Organizations that have a role in aligning these resources, such as labor unions are included. A lack of such inputs hampers large-scale diffusion.	(Kemp <i>et al.</i> , 1998) (Malerba, 2002) (Geels, 2004) (Bergek <i>et al.</i> , 2008)
4 Financial resources	Financial resources and the organizations (e.g., banks, incubators) or platforms (e.g., crowd funding or micro-credit ) to provide these resources, are needed for development and diffusion of the innovation, the production system and complementary products and services but also for adopting, implementing and maintaining the innovation. Lack of financial resources on the supply and the demand-side of the market can hamper large-scale diffusion.	(Kemp <i>et al.</i> , 1998) (Edquist, 2011)
5 Macro and meso-economic, institutional and strategic aspects	Macro- and meso-economic, institutional and strategic aspects refer to the overriding economic situation, such as a recession or the situation in one or more industries causing stagnation. Economic and strategic interests of countries and industries are often formulated as generic institutions. If these economic, institutional and strategic aspects are unfavorable, large-scale diffusion will be hampered.	(Kemp <i>et al.</i> , 1998) (Bergek <i>et al.</i> , 2008) (Edquist, 2011)
6 Socio-cultural aspects	Socio-cultural aspects refer to the norms and values in a particular culture or industry. These aspects might be less formalized than the laws and rules of the institutional aspects, but their effect might hamper or stimulate development and diffusion of radically new high-tech products in different industries. They include methods and habits, norms and values in industries ("the way to do things"). They also include interest groups or stakeholder groups outside the supply chain.	(Kemp <i>et al.</i> , 1998) (Bergek <i>et al.</i> , 2008) (Geels, 2004)
7 Accidents or events	Accidents or events outside the socio-technical system but with a large impact, such as wars, nuclear incidents, natural disasters and political turmoil, or the risk of these accidents or events, can hamper or stimulate development and diffusion of radically new high-tech products in different industries.	(Kemp <i>et al.</i> , 1998) (Ortt <i>et al.</i> , 2013)