# Chapter 2 - (Digital) Outcast

In this chapter I will focus on the micro-infrastructures that allow interactive practices to circulate. I will start by excavating the economic infrastructure in which these practices are found. When we deal with interactive practices, we deal with computational objects, software and formats. As an end product, they are enclosed media objects with a specific format that might be embedded on a platform (such as a file extension) in order to circulate. But they are first computed, developed through a programming language, and may even be encoded before being displayed on a web browser.

Interactive practices are cultural artifacts coded for distribution, and are consequently bound to a format. This format has both aesthetic and economic implications. Format, according to Jonathan Sterne, means focusing "on the stu beneath, beyond, and behind the boxes our media come in." (2012, 11) As he goes on to note: "studying formats highlights smaller registers like software, operating standards, and codes, as well as larger registers like infrastructures, international corporate consortia, and whole technical systems." (Ibid.)

These practices are distributed over the web for free. To what extent are these practices economically determined by the dynamics of software production? Why are they being produced and distributed, if they require high level development efforts but are then freely distributed on the web? *Cui prodest*?

If media production is an exchange of information goods, interactive practices might then be regarded as commodities. Archaeologists

like Colin Renfrew[1] have shown that, historically, commodities mark fundamental shifts in social life. Renfrew's analysis also shows that technological innovation is influenced as much by social and political factors as it is by purely technical ones (Appadurai 2013, 40). If we understand interactive practices as media commodities, we might then frame them as goods within an economic discourse, caught in a network of distribution, production and circulation. We need thus to look at some of the structures and infrastructures that are behind but yet follow part of an economically determined discourse.

What kind of value do these media practices hold in an economic scenario that requires them to be new and useful? The discourse around interactives such as i-docs and similar projects invokes "innovation," "emergent practices," "new media," and "change." Consequently, this means we must focus on the question of novelty and innovation, which has often been a prerequisite to the production of interactives. What does it mean to create something new and what are the consequences of such features? The novelty of interactive practices, once they began to be developed in the early 2000s, refers to their technical specificity (their invisible infrastructure), their appearance (the interface, or the browser display), but also their distribution (ARTE's website). IDFA (International Documentary Film Festival of Amsterdam) explains as much on its website when it equates interactive documentary production with "documentary storytelling in the age of the interface."[2] Investigating software means considering not only the visible part of its interface but also the invisible infrastructure as part of its materiality.

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1 Appadurai discusses Renfrew's work in his seminal book The Social Life of Things: Commodities in Cultural Perspective (1986). Appadurai also argues that things have a social life as "objects of economic value" (2013, 9); in other words, they are commodities.

2 If we look back at how the IDFA Doclab dedicated to interactive practices talked about the subject, we see that that they emphasize "newness." For instance, they refer to some interactives as "an interactive French web documentary," "new forms of documentary storytelling," "interactive documentaries and other new digital artforms that successfully push the boundaries of documentary storytelling in the age of the interface." (IDFA 2020)

The first part of this chapter will therefore focus on the economics of interactives and questions of production and distribution. I use an interdisciplinary approach to study interactive practices, combining media economics, software studies, format studies and archive studies. Indeed, innovation as a market-driven strategy in software has an inevitable consequence: obsolescence. This, of course, becomes a problem when dealing with media productions, because it threatens the preservation process. To ground my investigation, I will turn to research I conducted directly at archives and institutions. The "coring" of my excavation work took place during two visits to major Institutions in the Netherlands and in Montreal in 2018 and 2019: The Sound and Vision Institute and at the National Film Board of Canada, respectively. There, I had the chance to talk to archivists, software engineers and developers who are working on the preservation of interactive practices. Some interviews with web journalists and developers at ARTE and legacy media institutions such as *The Guardian* were conducted via email or Skype. It is clear that the way institutions deal with the problem of preserving interactives sheds light on the future of archiving practices in a digital and globalized world, where media circulate almost invisibly.

## 2.1 The Economics of Interactive Practices

In 1999, Roger Silverstone opened the first issue of the journal *New Media and Society* by asking other scholars what was new about new media. Responses discussed which characteristics made the Internet, in comparison to broadcast media such as radio and TV, a different or "new" medium. Authors agreed that "new media, indeed, affect and involve us fully as social and political as well as economic beings." (Silverstone 1999, 3) Twenty years later, I am viewing this "new" economic realm though the lens of interactive practices. In this part of the chapter, I will analyze interactive practices as cultural or information goods in a market. In other words, as valuable objects in an exchange between consumers (users) and producers. The aim is to understand the conditions of production, distribution and consumption of these objects.

To fully understand the economic value of such practices, it is therefore necessary to understand the broader field of media economics. It is interesting to note that the interactive practices that are the object of this research are available online for free. Their purpose is not revenue generation through on-demand fees or advertising.

Interactives are often described as "emerging practices." (Nash, Hight and Summerhayes 2014) This sheds light on one of their supposedly distinguishing features: a new and contemporary form, which opposes a traditional or dominant one. At least, this is the image of "emergent" cultural forms we have inherited from Raymond William's definition of the term (1980). However, when scholars refers to "emerging practices" in relation to interactive documentaries or i-docs, they are instead referring to an "emergent technology," (Nash, Hight, and Summerhayes 2014) which has nothing to do with a Marxist process of social transformation. Their idea of emergence pairs more with the idea of novelty, which is a central concept in the field of media economics. Media producer of such practices, then, do share a common goal: the "creation of novelty." (Hutter 2006, my translation)

The potential of something new, says Michael Hutter—a media economist—can attract the curiosity of a potential consumer (2006). And an information good's raw material (the information) can be used many times to create novelty. For instance, video material used in a documentary can be repurposed to create reportage, or to create newspaper stills.[3] When we think about the use of archival or historical footage, the dynamics are the same: turn something old into some new "thing." The so-called "Spirale der Neuheit," (2006) or "novelty loop," is an unending process in the media industries that enables the constant creation of new products.

Another key element of information goods is that they are "non-rivalrous" and "non-excludable." (Doyle 2013; Quiggin 2013) In other

3 An interesting example is The New York Times and NFB coproduction *A Short History of the Highrise* (2014), directed by Katerina Cizek. The interactive documentary uses many stills from the photo archive of The New York Times.

words, they can be consumed infinitely by everybody.[4] For instance, marginal costs—the cost of producing, say, copies of a DVD for distribution—are very low, and that allows for an almost unending cycle of circulation and distribution. But if a physical object like a DVD still faces some marginal costs, on the Internet the costs of a digital copy—the downloading of a video file—drops to nothing. If we regard the Internet, then, as "the" market, what are the consequences for interactive practices distributed online?

In the game industry, there is something similar: free online games. Of course, the aim of these games is ultimately revenue generation: particularly eager consumers can purchase in-game items, props, additional characters, etc.[5] This kind of revenue profits from the fact that the games in question are first distributed on the Internet. In fact, a product that is shared in a network benefits from so-called "network externalities:"

> In a network with n-members, there are n (n-1) possible connections with all existing members of the network, but also creates an addi-

4 Information, argues Quiggin, is a "public good". A public good is defined as "non-rivalrous" and "non-excludable." The former refers to consumption of "one doesn't affect its availability for others" (2013, 90). The latter means that the availability for some users does not preclude its consumption by others.

5 According to Lin and Sun: "Free game players can purchase game points at convenience stores, video game retail stores, bookstores, net café's, and other real-world outlets and use them (or cash) to purchase props from game Web sites, telecommunication sites, or portal sites. Players can also use cash or points to purchase items from virtual shopping malls via game interfaces. Purchasable items belong to two categories: (a) functional or instrumental props that increase the offensive or defensive power of characters and their pets (e.g., increase character vehicle speed, double or triple experience accumulation speed, repair weapons, or retain experience value upon a character's death) or (b) decorative or expressive props for altering character or pet appearances and for enhancing social or communication tools that allow players to broadcast accusations, love proclamations, or congratulations to each other". (2011, 271)

> tional connection available to each other user. It is this latter effect that creates the externality. (Quiggin 2013, 95)[6]

In other words, every user that is drawn to a platform by a media object they consume engages other network externalities and thus increases the potential that the audience will grow.[7] Information is of course subject to proprietary rights, but the absence of "explicit" charges opens the door to other types of revenue—which usually takes the form of advertisements. In the case of publicly-funded broadcasters—some of the examples analyzed here come from ARTE and BBC—revenues are largely the result of audience share—itself generated via externalities.[8] The same goes for private broadcasters and international agencies such as the UNHCR, which rely on private international funding or government funding.

The Internet can be regarded as the market for interactive practices. Paolo Cellini, former manager of Disney's Strategy and Business Development, views the Internet as a digital media market. In a recent book, he argues that some basic features of the Internet encourage or foster the sharing of information, and thus of information goods: "the basic concept of its economic contribution is actually very simple: the Internet facilitates fast and inexpensive sharing of information. This leads to an increase in information efficiency, which promotes the creation of products and services based on the sharing of information." (Cellini 2015, 15)

To better understand how the Internet as a market works, it is necessary to first understand its attributes. The Internet can be regarded as a market platform that, due to its pervasiveness (or dissemination), allows users (or consumers) to benefit from network effects. Another

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6 Hutter also talks about *Netzeffekte* (2006, 41).

7 Following Cellini: multi-sided platforms (such as the Internet) are "market contexts in which two or more customer groups are satisfied and where the customers of at least one group need the customers of the other group for various reasons" (2015, 173).

8 ARTE, for instance, is 95% publically-funded as reported by Ranoivoison, Farchy and Gansemer (2013).

feature and consequence of the network effect is that the cost of access to the Internet is a variable that decreases over time. Costs diminish, innovation improves, bringing with it a continuous increase in connection speed (as Mbps).[9] This is an unending process and virtuous cycle.

Although the Internet relies on physical hardware to run and store information, this process of change is continuous. Since the spread of the World Wide Web as a communication network in the mid-nineties, the Internet has changed from being a desktop platform to mostly a mobile one (in terms of user numbers). The next significant innovation is the so-called "Internet of Things," or Industry 4.0,

> where the lowering of access costs and high bandwidth speed allow the Internet to establish itself as the reference infrastructure for the exchange of information. Not just people, but also sensors, objects and things are connected to the Internet to exchange information. This stage will bring a further explosion of devices connected online and content created, as it will no longer be only humans but also objects that create information. (Cellini 2015, 46)

The interactive practices I analyze are largely made for the Internet as a Social Platform (web 2.0), where the reception of information is bidirectional. And social platforms increase the network effect and thus externalities. In fact, most of the websites use APIs that permit them to embed social network links such as Facebook or Twitter.

Moreover, the Internet as a new media market involves a different set of economic principles from those that define traditional industrial production. In the digital realm, the distribution of new products involves an incredibly marginal cost. For instance, the distribution of a good in the industrial context entails a higher cost than it would in the digital context, since reproduction and distribution costs are very low. Therefore, a shift in demand does not increase the price. If the costs of reproduction for media content producers are already low, distributing content online avoids almost entirely costs of distribution. Such a market enables even very small companies to provide services or content

9 Measured in megabytes per second.

and distribute it online.[10] Nevertheless distribution on the Web means to compete with the visibility of others.

In an economic scenario of corporate giants (with many "slaves") how can a publicly funded broadcaster survive? ARTE, in order to compete with other commercial channels, must brand its content. On its website the company states "[ARTE] conveys its distinctive slant as assertively on air as it does online and is aiming for two goals: harness technology so everyone can enjoy ARTE on any screen any time and stay at the cutting edge of digital creation to reach new audiences and open up a forum for innovation." (ARTE 2017, 68) ARTE's editorial guidelines outline the principles of "loyalty building," "innovation," and "audience expansion." (ARTE 2017, 2) In terms of innovation, they intend to find space to experiment with new formats and original content, maintaining audience loyalty by continuing to offer specific programs or weekly topics. As for audience, it wishes to conquer "new categories of viewers." (ARTE 2017, 2) In short, in the neoliberal marketplace, producers are compelled to innovate in order to maintain funding.

To understand the economic situation of media producers, such as broadcasters and independent production companies and institutions, it is helpful to consider the concept of the "creative industries:"

> The idea of the creative industries seeks to describe the conceptual and practical convergence of the creative arts (individual talent) with Cultural Industries (mass scale), in the context of new media technologies (ICTs) within a new knowledge economy, for the use of newly interactive citizen-consumers. (Hartley 2005, 5)

Creative industries produce cultural and information goods. The value of these goods is largely measured by their originality. This originality,

10 Cellini writes: "In the case of software development, for example, once the software has been developed, the cost of electronic distribution via the Internet is virtually nil. The cost of producing a copy on a media support (CD, DVD) is also negligible. […] Therefore, high fixed costs and low marginal costs are a particular feature of high tech companies." (2015, 170)

or novelty, as Hutter argues, is "the decisive value criteria for the interest of the user." (Hutter 2006, 29, my translation) With novelty, comes a "feeling of surprise [that] may encourage the user to think that he is consuming new information," even if the content may be the same (ibid. 29). Therefore, form or aesthetic is an important aspect of novelty.

With regards to the topic of migration, which has been widely reported on by every mass media outlet, why should the user be interested in consuming it over and over again? Can the story of migration or exile be told "differently"? How might we overcome the "compassion fatigue" (Moeller 2002) of humanitarian discourse? The point and aim of the productions, of course, is to offer users a different perspective through technological innovation. The platform stays the same, but in the case of interactive practices about migration, the storytelling changes. It uses the computer's specificity in every way it can (Murray 1997, 2011): interactivity, a rich media environment, and the illusion of living the same exilic experience from the comfort of one's own home. This shift entails a different production process and a different team of experts.

For example, it is useful to recall an anecdote about the creation of "The Refugee Challenge. Can you break into Fortress Europe?[11]"( 2014), an interactive-text adventure made by *The Guardian*, which invites the user to become a Syrian refugee. This text-adventure uses a simple "role-playing game" structure, and has a choice-based narrative. You picture yourself in the role of a refugee on their way to Europe. Every step is represented by a simple question to which there are two answers. For instance, "would you like to reach Europe or just reach Turkey?" Every time you make a decision, you are presented with a new question that allows you to go further or forces you to end your journey, because you made a choice that will not let you carry on.

In an interview, one of the creators explains (Domokos 2016) that the content of the text-adventure was unused material from a previous reportage. The idea of trying to re-shape that content, in order to convey issues about closing migrant routes, led to the creation of *The*

11 I will refer to it simply by its title *The Refugee Challenge*.

*Refugee Challenge* (2014). The following year, the BBC produced *The Syrian Journey* (2015), another interactive-text adventure on migrant routes, but with additional features and a more complex branching structure. Special teams at *The Guardian* and the BBC created both of these text-adventures: *The Guardian*'s Visual Team (a merger of the Interactive team and Graphic team) and the BBC News Visual Journalism team.[12] In the case of *The Refugee Challenge*[13], the journalist John Domokos collaborated with Sean Clarke to create the game.

Other broadcasters such as ARTE often rely on a team of independent companies to develop interactive content. In 2013, ARTE commissioned and outsourced the development of *Refugees* (2014), a newsgame that explores three different refugee camps, to a small company, Method in the Madness (Becker 2016). The UNHCR also outsources the creation of media content to other companies. For example, the serious game *Against All Odds* (2005) was commissioned by UNHCR Sweden but was outsourced to a local developer's company and latterly translated into different languages.

In 2014, ARTE announced that as a result of technological changes affecting the industry, it would update its mission, with the aim of becoming a "bi-medial"[14] production company (Wiehl 2014, 79). This shift would be reflected on both their cable TV broadcasts and on their website (both mobile and desktop). With particular emphasis on the latter, the company hoped this shift would enrich their content, make use of social networks, and offer services through "innovative technologies." (ARTE 2014) Although this was perhaps just a marketing strategy, the format helped "ARTE's goal to foster its unique selling point – its brand-image as an innovative, transnational, European avant-garde venture." (Wiehl 2014, 83) Providing an additional platform for a TV audience is

12 See Banerjee 2018.

13 As Domokos explained. he did so because he wanted to find a specific format that addressed the various difficulties that several Syrian refugees went through on their journey to Europe (Domokos 2016).

14 Refers to how ARTE had marketed itself as a "100% bi-medial channel" (Wiehl 2014, 79)

a way of introducing novelty,[15] and keeping audiences engaged across platforms. Maintaining an audience and fulfilling its mission is the most important way for a broadcaster like ARTE to generate "revenue" for public broadcasting, and ensure it continues to receive public funding.

If I widen my perspective and look at other case studies, I see that ARTE is not the only broadcaster to act in such a manner. Indeed, other public broadcasters, like the BBC, are also largely publicly funded. A significant portion of my case studies is also non-profit organisations. In the US, the broadcaster PBS[16] is funded both by private institutions and by the governments. It also makes money from advertisements, but the company is officially a non-profit. The same goes for Al-Jazeera and *The Guardian*; the royal family of Qatar own the former, and a trust owns the latter (AlJazeera 2020). Donors such as the government, private organisations and private citizens fund the UNHCR, another international non-profit organisation (UNCHR 2020e). The Canadian government and ad revenue represent the most significant sources of funding for the NFB. Other independent, smaller companies or creators like the Submarine Channel rely on the government, and/or funding from European and national institutions or programs. The same is true for the producers of some interactive maps, like the one by CREATE Lab (see Chapter 4), which is funded by universities, independent companies, and artists in collaboration with the UNHCR. The same goes for maps and data visualizations created through Story Maps[17] and Tableau with UNHCR data. The impetus to make these interactive practices, then, is create cultural and social value instead of profit. They are distributed freely as a commitment to the public (as is the case with public broadcasters), or simply to serve a "useful" (humanitarian) cause.

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15 Wiehl explains: "If one synchronizes for example one's second screen-device with the broadcast programme, one gets alternative points of view – others than those on the 'regular' television-set screen." (2014, 84 )

16 PBS distributed *Undocumented* (2013), a documentary related to serious game *The Migrant Trail* (2014). I will explore this in the chapter "A View from Within."

17 I refer here as well to Chapter 4.

In order to compete in a market where other producers are generating greater profits, publicly funded broadcasters and non-profit organizations need to adhere to their "mission statement" so as to retain funding. With regards to interactive practices about migration, this means ensuring that innovation and the enrichment of and access to content go hand-in-hand (Ranoivoison, Farchy and Gansemer 2013). ARTE was the first channel (in France) to pursue content innovation.[18] Interactive practices thus form part of a strategy of survival, adopted by media producers and broadcasters, in an environment of increased and increasing competition.

By investing in innovation and branding, established legacy media companies and public broadcasters can retain and build their audience. But they also rely more heavily on re-editing and re-using their content in order to create novelty. Indeed, innovation is not simply about creating an entirely new product; it also means monetizing old material, or "raw information goods" as in the previously mentioned "Spiral of Novelty" (Hutter 2006).

According to Bourdon et al., since the 2000s, PBS has faced "competition from powerful global media players, the fragmentation of audiences, and the requirement to transition from a broadcasting mindset to a digital mindset." (Bourdon, Buchman and Kaufman 2019, 1) And to do this, it, like many publicly funded broadcasters, has had to "actively engag[e] audiences." (Ibid) A broadcaster's archives, in this scenario, might be re-used as a "resource to appeal audiences in new ways."(ibid. 2) The same can be said for legacy media groups such *The New York Times*. In an "Innovation Report" from 2014, *The New York Times* argues: "in a digital world, our rich archive offers one of our clearest advantages over

18 In an issue of *Observatorio Journal* about strategies in digital innovation, Ranaivoison, Farchy and Gansemer add that "these well-established channels have positions and images to uphold. However, the arrival of new, free channels has undermined their viewership […] faced with competition from the new DTT channels, illegal downloading, and the announced entry of giants like Apple and Google on the smart TV market, they strike back with innovation." (2013, 32)

new competitors. As of the printing of this report, we have 14,723,933 articles, dating back to 1851 that can be resurfaced in useful or timely ways. But we rarely think to mine our archive, largely because we are so focused on news and new features." (The New York Times 2014, 28)

It is easy to view the production of i-docs—and interactives in general—as public broadcasters' response to a changing media environment, in which audiences are increasingly fragmented. As Sven Stollfuß states, in Germany, for example, social media users have the most impact on television production. That is why broadcasters such as ARD and ZDF merged to create a new network that directly addressed younger audiences as collaborators (Stollfuß 2019). Public broadcasters such as ARTE and the BBC are not the only companies to engage younger audiences in this manner; other media producers, like the UNHCR, Al-Jazeera and even universities, also deploy similar strategies so as to reach new audiences online.

In all these cases, revenue is not the goal; instead, it is the social, cultural and artistic value of the media commodity itself. If externalities derived from the network effect both build and retain an audience, this focus upon audience share allows the producers above to compete with other partners that derive revenues principally from advertising.

## 2.2 When the New Gets Old

Innovation comes at a price. It not only means producing new content through so-called "residual" or recycled media (Acland 2007); it also entails innovation at the level of media formats, content and access. The latter refers to investment in "emergent practices" not simply with a view to standardization but also customization, which privileges individual user experience. This is another strategy that works especially well in relation to web-based content. Indeed, the ability to use data-gathering technologies such as tracking systems and cookies to monitor user behaviour, allows producers to cater to each user's taste. Part of this strategy is derived from the infrastructure of websites and apps themselves.

In the global neoliberal market, therefore, the future of interactive practices is inextricably linked to technological development, and the way it shapes user experience. Recent developments in the production of interactive practices demonstrate how mobile platforms—smartphones—are preferred to desktop ones (Stollfuß 2019, 2). The current trend is to "go mobile," or to try new forms of engagement. At a 2016 showcase for interactive documentaries and interactive applications at IDFA (International Documentary Film Festival of Amsterdam), most of the new projects were developed for VR apps. Some of the most successful digital businesses have acquired VR and AR technology: Facebook bought Oculus VR, Google created the Daydream headset, and Microsoft released its first AR set in 2016, called the HoloLens.

In the projections for data traffic across devices made by Cisco VNI Global (see graph from Bolsen 2017) they forecasted five years: it projected a significant increase in smartphone and M2M (machine to machine devices, such as the Amazon Echo) use by 2021, while use of PCs will proportionally shrink. What is the other side of the coin when it comes to innovation? The market determines the future of media producers; that is, if the audience goes mobile, media production will follow. This continuous process of change that, on the one hand is driven by technological innovation, and on the other by shifts in the economy, also entails a process of endless obsolescence. As Wendy Chun explains, "to call something new is to ensure that it will one day be old. The slipperiness of new media—the difficulty of engaging it in the present—is also linked to the speed of its dissemination." (2008, 148)

In other words, the speed of change in media production highlights a very real fear of obsolescence. The economic model for the contemporary Creative Industries is one of late capitalism, a consumerist mode of production that, as the sociologist Zygmunt Bauman argues, customizes products and fosters new (unneeded) desires, so as to ensure its own survival as a system. He argues that consumer society aims to perpetuate "non-satisfaction," by devaluing and denigrating products immediately after they reach consumers' hands: "What starts as an effort to satisfy a need must end up as a compulsion or an addiction." (Bauman 2007, 47)

Like material commodities, interactive practices in their constant search for "novelty," also fall into an unending process of disposal; if this obsolescence is not planned, it is at least foreseeable. The discourse around media economics implies that if you fail to innovate, you die—economically speaking, at least. Let us recall *The New York Times*' "Innovation Report." Following a recognition of its rich archive, the newspaper struck in 2017 a tone of warning: "[The New York Times] is uniquely well positioned to take advantage of today's changing media landscape—but also vulnerable to decline if we do not transform ourselves quickly." (Leonardt et al. 2017, n.p.)

To transform, to change, to keep up to date. This neoliberal logic haunts the discourse of innovation strategies that broadcasters and other media producers pursue. When a business model fails, it is time to find a new one. In the case of interactive practices on the Internet, these media objects follow and adapt to their audience's new desires or compulsions, because retaining an audience is the principal way companies maintain funding. Sandra Gaudenzi, part of the group that first coined the word i-docs, warned about the future of interactive practices:

> TVs have seen their budget shrinking (the reason being a mixture of lower advertising revenues and lower audiences due to other forms of online entertainment) and this has had a knock-on effect onto documentary and factual production – interactive docs being positioned as the poor brother of documentaries. Data analytics has told us that more than 50% of video consumption in 2016 was through mobile phones. This means: forget complicated design that would be too fiddly on a small screen, let's concentrate on quick, short forms that we can browse from our thumb." (Gaudenzi 2017)

The model keeps changing and this constant transformation makes these practices, as Chun stresses, "at the bleeding edge of obsolescence." (2016, 1) In other words: the new gets old even more quickly.

The neoliberal—or media—economic logic of a world in which data can flow almost without borders allows media to be reused, in what Michael Hutter calls the "novelty loop." (2006) This repeated use of the

same material—a practice that can also be found in early medieval times—is present in academia, cultural institutions and archives, that are concerned with what John D. Peters ironically calls a "memento mori" (2015b, 87)[19] of postmodern humans. Babette Tischleder and Sarah Wasserman remind us how western culture (and particularly neoliberal economies of free trade) base their economic logic on obsolescence (2015).

Moore's law of digital progress (the number of transistors per square inch on integrated circuits doubles every 18 months) creates the perfect conditions for novelty. For instance, if you want to enjoy a VR application on your Android smartphone, you have to make sure it works on your current operating system environment. If it does not, you will be compelled to update your system, but that might not be enough: perhaps the application runs slowly on your "old" smartphone because of its limited hardware capacity. Consequently, you might choose to buy a new phone with the latest operating system in order to enjoy the "latest" content.[20]

I first heard the word "interactive documentary" in 2011. It was at that point something "unheard of"—indeed, it sounded "new." My interest was piqued because of the concept's novelty and its promise of innovation. In 2018, not even a decade later, Sandra Gaudenzi claimed that there is still no valid business model and that we should forget

19 "Audio-visual and digital hardware are the memento mori for postmodern humans, reminders of what was and is no more. Know thyself: look at dead media. Throwing away old storage media would be like killing the dead." (Peters 2015, 87)

20 "We entrust our lives and our identities to computers, although we all know that the half-life of digital hardware and software is shorter than that of any analog medium that came before. As a comparison, the development of photographic technology from the daguerreotype and plate cameras to light-sensitive film took decades; the formats and designs of digital cameras today change every season. Obsolescence does not just drive the development of new models; it also determines the relations between computers and their periphery." (Tischleder and Wasserman 2015, 7)

about complicated interactive design and focus on easy mobile applications (2017). In the meantime, many interactive practices have been produced, but originality does not seem a reliable indicator of audience development and retention. This may indicate that, despite interactive documentaries' fancy narrative features, traditional or linear storytelling represents a more reliable business model; quoting Gaudenzi again, interactive documentaries might be regarded as the "poor brothers of documentary" (2017). This is perhaps merely an unfortunate definition, but what the development of interactive practices has shown in the last decade is that non-profit productions within the creative industries often rely on the latest technological fads in order to generate audience interest, but, in so doing, condemn their products to swift obsolescence.

## 2.3 Update or Die: Format Wars

Paraphrasing Chun's book, but also recalling the title of a conference that was held at the Phi Centre in Montreal in 2017, to "update or die" is a phrase media producers must keep in mind when creating interactive (digital) media. What I want to investigate now is the relationship between the rapid obsolescence of interactives and their materiality. In so doing, I hope to discover why their rapid disposal is a foregone conclusion.

If we look back at the history of media and film we can argue that disposal, or better put, "waste disposal," is not new. Amusingly, Daniel Herbert asserts that the media business is directly connected to the waste disposal industry. He recalls the story of Wayne Huizenga, the owner of Blockbuster, who, before pioneering the video rental business, created Waste Management Inc. Herbert argues that these two businesses indeed have something in common:

> the growth of both companies entailed geographic expansion. But again, this similarity between video and garbage could simply result from basic capitalist processes, where in wealth tends to become

> centralized while successful firms expand to new markets and spaces. Yet this geographic expansion suggests a different but related link between Waste Management and Blockbuster—namely, that they were both involved in distribution. (Herbert 2016, 21)

From this premise, Herbert continues his research by interviewing film archivists (from a corporate Hollywood studio) on their roles as "disposal managers" that enact the "garbage logic" of the movie industry. Since the movie industry has shifted to digital, a growing concern today is how to manage (digital) data (2016). Herbert reports that a daily routine in the digital media archives is "figuring out what all the files are, how they relate to each other, and maintaining those relationships […] This means that archivists at this studio, like librarians and archivists at numerous other institutions, have had to become data management experts." (2016, 24)

Interactive practices are an archetypal example of the problem of preservation in the digital age. More specifically, web-based media objects pose a challenge to archivists in terms of the processes of storage, preservation, and selection—precisely because of their continuously changing nature. This "changing nature" is a consequence, too, of their status as software. As Sterne notes, computer hardware and software are designed to be wasted: once a product is released, developers are already working on the next version that would replace it (2007). Interactives distributed on the web are a repository of any kind of file material, or data, around which they have been structured using a specific encoding. This encoding makes their accessibility online possible. But in an environment of ever-changing standards, there is a need to keep things updated, so that media can be accessed through new and diverse platforms or devices. This process of updating is not automatic; it requires maintenance, which comes at a real cost.

One of the first webdocs in Italy was a series of episodes shot in a refugee camp in Abruzzo. There, people who lost their homes during 2008's L'Aquila earthquake were displaced and lived in tents. The director Stefano Strocchi produced a webcast that was aired daily on a dedicated website, and which was later presented at IDFA and broad-

casted on Al-Jazeera. Some of the material later became a documentary feature film, but the webdoc is no longer accessible because the website was put offline many years ago. The same is true of many media I analyze in this dissertation. By seeing what happened to them, we might better understand why they became outcasts.

If you try to access some other webdocs from ARTE's website, you will be surprised. First, depending on the device you use, certain popular webdocs such as *Prison Valley* (2009) are inaccessible, because they do not work on some mobile operating systems. Those systems do not support an Adobe Flash plug in, and the webdoc only works on desktop browsers if you download the plug in. By December 2020 Google Chrome has stop offering the Flash plug in.

Adobe Flash software was widely used to create interactive media objects on the Internet, and many of the serious games I analyze were developed with it, for instance *Against All Odds* (2005) or *The Migrant Trail* (2014). Ironically, I came to know of Flash's importance once it was deprecated ("a discouragement to use a technology").[21] Indeed, once experts began discussing the possibility of an open web standard such as HTML5, "proprietary" software like Adobe Flash fell into disuse.[22] Anastasia Salter and John Murray argue that its deprecation was also part of a format war: "the ubiquity of Flash depended as much on its perception as its technical capabilities. When it worked, it was virtually invisible, showcasing instead the content. But when it became a point of contention between Android and iPhone, between closed technologies

21 As Sterne argues, some formats are noticed in their absence, while others become core parts of the user's experience and therefore noticeable in their absence. In either case, the sensory and functional shape of the format may emerge from the "objective necessities and constraints of data storage" and transmission now of their development, "but they also accrue phenomenological and aesthetic value" as people actually experience them." (2012, 20)

22 However, media formats like Flash, as a recent volume explains, are essential to understanding "how medial artefacts and information can pass through vast media infrastructures, and ensures interoperability between diverse industries and ecologies of media devices." (Volmar, Jancovic and Schneider 2020, 7)

and modern, open standards, Flash became an ideological warzone." (2014, 113)

In 2010, Steve Jobs wrote an open letter published on Apple's website criticizing Flash. He claimed that the software was a proprietary closed system that threatened the security[23] of the larger system on which it was operating. Jobs instead encouraged the use of open standards such as HTML5 in order to ensure the easy functioning of interactive features on mobile phones (as well a smaller impact on battery life). In short, HTML5 is not software, but a mark-up language, and thus enables the browser to do all the heavy lifting, and avoid other processes that might affect the computer's CPU. Moreover, Flash was developed for mouse desktops, not for touch screens. Jobs continues:

> Our motivation is simple – we want to provide the most advanced and innovative platform to our developers, and we want them to stand directly on the shoulders of this platform and create the best apps the world has ever seen. We want to continually enhance the platform, so developers can create even more amazing, powerful, fun and useful applications. Everyone wins – we sell more devices because we have the best apps, developers reach a wider and wider audience and customer base, and users are continually delighted by the best and broadest selection of apps on any platform. (Jobs 2010)

For all these reasons, Jobs decided to end Apple's support for Adobe Flash, and pushed Adobe to develop open standards. It is still unclear if this push towards deprecation was merely a business strategy, since Apple wanted to innovate and leave behind any software that represented an (economic) problem in the creation of new features on their mobile devices. Whatever the case, early Android iterations supported Flash, but it eventually failed. Apple won, or at least the W3C did.[24]

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23 If run through AIR (a native app), it gives the user an unrestricted access to local storage and filesystems, whereas browser-based applications only have access to individual files selected by users.

24 The definition of certain web open standards is decided internationally by the W3C, the World Wide Web Consortium, an organization founded by Tim-

In 2017, Adobe announced that by 2020 Flash will no longer be supported, distributed or updated, thus reach its EOL or "end of life" (Adobe 2020). This "format war" is a sign, Sterne highlights, that one standard is starting to dominate. He argues: "the combinations of secrecy, coercion, public relations, litigation, legislative lobbying, and attempts to control the market are common elements of the process through which standards come to dominance." (Sterne 2012, 133)

Open standards won because they enhance data exchange, and thus free global circulation, since you do not need to pay a vendor to offer content on your platform. Much like other media standards, such as the Unicode format or MP3, HTLM5 also offers transparency in its specifications.

But before HTML5 returned with a version that enabled "canvas" and therefore interactive content to be embedded on the webpage, Adobe Flash was already ubiquitous. Indeed, the pervasiveness of Adobe Flash as a media player and as an "authoring platform" (the file extension is SWF and uses international standards for the compression of audiovisual content) was such that it reached 99% of users (Salter and Murray 2014). Flash, claims Anastasia Salter and John Murray, has shaped for years not only a community of professionals and dedicated amateurs, but also a "view" of interactive content (ibid.). They explain that it was the first software to make animations, and was later developed to enable user interaction through the mouse cursor. And as animation software, it shaped animation aesthetics through recourse to the familiar metaphors of filmmaking and theatre.[25] As game development

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Berners Lee (the inventor of the World Wide Web). It mediates disputes between "vendors" over issues of standardization and attempts to offer a consistent solution for every party. However, not every country in the world has a section of the W3C. China recently joined, but its headquarters are at MIT in the USA.

25 According to Salter and Murray: "at the heart of Flash's success and power lies its compelling use of metaphor: the adoption of the "frame" as a fundamental unit of a Flash movie, and the "stage" as the setting where "characters" would perform actions, were familiar and comfortable concepts that worked together to present an experience. Even the original idea of calling an invocation of an

*Fig. 1: A fake picture of Steve Jobs wearing an anti-Adobe Flash Logo*

Image source: Gigaom.com, https ://gigaom.com/2010/04/29/steve-jobs-thoughts-on-flash/.

software, it enabled a new way to distribute this same content: through the web.

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action on a character "telling" evoked the experience and dynamics of directing a play. The entire user interface is set up to resemble a set of filmstrips. The simple example of bouncing a ball is so readily realized because the timeline makes visible the change over time dynamics instead of abstracting it at the level of algorithmic process." (2014, 34)

Steve Jobs' critique and the deprecation of Flash hailed the end of another era—that of the desktop PC. The focus has now shifted to mobile web browsers and native apps (which work on specific operating systems, such as Android or iOS). Even broadcasters have adapted to this change, creating dedicated mobile apps that users can download on their smartphones and through which they can access a library of content (for instance, ARTE, the BBC and *The Guardian*). For example, in 2016, ARTE produced an interactive text-adventure about a refugee journey titled *Bury Me My Love* (2017) designed specifically as a mobile app, which you can easily download from Google Play. Moreover, websites are now accessible from any and every device. This explains why Jobs wanted HTML5 to be developed rapidly: he foresaw, or was perhaps facilitating, mobile phones' market saturation.

Another ARTE-produced interactive is a useful example with which to understand the dispute between proprietary formats and open standards. The newsgame *Refugees*, in which the user becomes a reporter and conducts interviews, began airing on arte.tv in autumn 2014. The game featured three different locations and many audio-visual interviews organized in a sort of a point-and-click adventure.[26] The project is directly connected to social media: once the user reaches their goal in the game, they can publish or share with friends a multi-media reportage composed of some of the audio-visual material collected during their gameplay.

*Refugees* was released at the end of 2014 for desktop PC and mobile phones. However, in 2016, the mobile website ceased to work. David Zurmely, an ARTE web journalist, and Laure Siegel, the principal investigating journalist who provided the in-field audio-visual footage for the game, informed me in early 2016 (see Zurmely 2016, Siegel 2015) that this would happen. This was because ARTE's 3-year contract with the company that developed and regularly updated the features of the game had expired. As a result of a lack of financial resources, the host server on which user actions in the game were stored, would no longer

26 I talked about in the Introduction and I will analyze it more accurately in the next chapter.

"save those data anymore and thus the website will shut down" (Siegel 2015). In technical terms, the developers needed to update the code with a new API (application program interface) as well as other features, but there was no more money to perform this maintenance. The desktop website was shut down at the end of 2018. There is now no other way to access this newsgame than a user made screen-caption video of the gameplay, recorded on ichbinchristorg's YouTube channel ("Let´s Play Refugees" 2016). This example demonstrates that despite HTML5 encoding, the media is no longer accessible (if it had been encoded with Flash, it would still be online—though only until the end of 2020). So where has *Refugees* gone?

Of course, the game in binary code, or its "source code," can be easily stored. Zurmely, who also works in the field of content innovation and online media practices at ARTE, reminded me (Zurmely 2016; 2018) that the broadcaster pays a third party to store its productions as binary code, i.e. they use an external server. However, a problem arises once that code is interpreted by software on a particular operating system.[27] Since these productions are web-based, the browser software enables this process, which directly embeds plug-ins in order to run specific media files (like Adobe Flash) if needed. And each browser works differently on each operating system: Firefox, for example, uses one set of code when it runs on iOS and another on the Windows operating system.

The irony is that the production of *Refugees* began in 2013 with the express purpose of avoiding some old—or obsolete—media formats such as Adobe Flash.[28] By turning towards two pre-2013 ARTE productions, we can see why this is the case. *India 2009* (2009) depicts everyday life in

27 As Smits and Smite explain: "basically, the work itself can be the code. The code as such isn´t difficult to maintain. But the problem is caused by the fact that this code operates only in the relevant environment." (2015, 24)

28 The obsolescence of Adobe Flash has caused a battle. For a long time, Adobe Flash was the most used platform for the development of interactive content. Since smartphones became ubiquitous, corporations such as Apple pressured Adobe to cease operations on Flash Player, because the mobile iteration of the software was vulnerable to cyber attacks. In 2015, Adobe launched new soft-

India sixty years after it gained independence from the British Empire. The database consists of audio-visual interviews with both Indians and non-Indians. Through the website we can still access the videos, but the main homepage, as David Zurmely recalls: "uses an external service, the Google Maps API, to display an itinerary on a map. The way the webdoc communicates with Google Maps is now deprecated, because Google changed it in order to upgrade its service. As consequence: the map is no longer visible" (Zurmely 2016; see figure 2).[29]

*Fig. 2: A screenshot from India 2009*

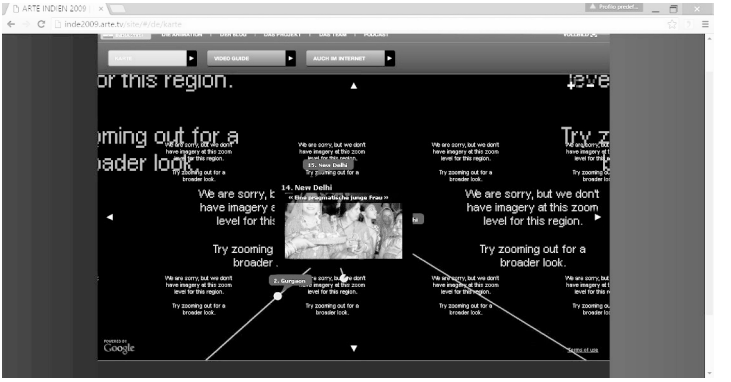


Image source: screenshot by author.

Moreover, if you want to access the website through a mobile device, you need to download a plug-in—but your device will most likely not support it. By 2021, we will no longer be able to download a plug in, thus to watch most of the interactive content made with Flash. ARTE has subsequently decided to shut down *INDIA 2009* (2009).This example demonstrates that to avoid obsolescence, producers must adopt (and

ware to replace Flash called Adobe Animate CC. Mozilla Firefox blocked the plug-in in mid 2015 (Gibbs 2015).

29 When I began researching, the website was still accessible. But now it is no longer accessible. You are simply redirected to ARTE homepage.

adapt to) the latest technology. And that is what ARTE did with *Refugees*: by using the new standard web-code HTML5 (and working in CSS and Javascript), the newsgame could be run easily in mobile phone Android environments.[30]

In a similar way to the Google Map API of *India 2009*, the API used for providing additional features from Facebook for *Refugees*, would no longer be updated. But the developer Stephane Becker, CEO of Method in Madness, the company that worked for ARTE to develop *Refugees*, explained that only some of the features would cease to function as a result of this incompatible API. But what exactly are API?

APIs are packages of information that platforms such as Google, Amazon, Facebook or Instagram, provide freely (under what conditions, however, it is not clear[31]) to developers that want to create applications with a particular feature. For example, if we want to use a like button or share button from Facebook on our blog, we need to implement a certain API code. Or, if we need a map we might use an extension of Google Maps, or OpenStreetMaps. To avoid an API like this, you would have to program such an application yourself. This would require too much money and labour; why should we invest in the development of a map when there is already a free API available to us? That said, we cannot control Google Maps' development, and so we have to check when new APIs are released in order to maintain accessibility. These API are constantly being updated[32] and if they are deprecated (yes, they get deprecated too) they will become obsolete; in that case, your website

30 Apple and Google strongly supported the development of HTML5.

31 In 2013, Oracle sued Google for using its API, claiming that it is proprietary software. Oracle lost, as the judges declared that the API cannot be considered part of an artistic creation and is therefore not protected by intellectual property law.

32 This is taken from the Java website: "Java provides a way to express deprecation because, as a class evolves, its API (application programming interface) inevitably changes: methods are renamed for consistency, new and better methods are added, and fields change. But such changes introduce a problem. You need to keep the old API around until developers make the transition to the new one, but you don't want them to continue programming to the old API." (Oracle 2020)

extension will not work anymore. This is what happened to *India 2009*, and to many of the features of *Refugees*. ARTE decided to shut down the latter's website, instead of recoding the non-working parts.

David Zurmely explained that one of the reasons ARTE decided to put some webdocs offline was because of the same fear of deprecation. The company worked on many projects using an old version of the WordPress platform, which was not updated automatically. A further reason concerns property rights. ARTE outsources labour to different production companies, and once the contract expires, the company are obliged to put everything offline—unless they extend the contract. Other times it is simply because of Flash:

> the media urls in the webdoc were hard coded in the compile flash, we had to ask the flash developer to modify it from the source. The developer did it for *Afrique 50 ans d'indépendance*. That was very kind of him, because he had to setup a whole flash development framework to do this (he doesn't code in flash anymore, as it is predicted to disappear!). So, it is quite complicated, and will only save the webdoc for a couple of years. (Zurmely 2016)

The decision as to whether to keep an interactive online therefore has to do with proprietary rights, the deprecation of technology, outdated "topics," and, above all, costs. After facing many problems with webdocs, Zurmely explains that ARTE's strategy changed, and it has decided to focus less on interactives:

> Finally, we produced fewer big webdocs in those last years. This was a choice from ARTE to concentrate energy and money to do better what we do: video and films, as we are a TV channel. So, we had lots of changes in our internal workflows but also on our websites. ARTE is now available on a website, mobile app, ADSL, HbbTV, PlayStation, YouTube, with most of its programs in French and German, and some of the programs subtitled in English, Spanish, Polish and soon Italian. Our tools are now much better. The teams are more efficient. That was a big deal to move forward. And now, all that we produce for digital and not for TV broadcast is also archived, in the same database with

> the same metadata, which was absolutely not the case at the beginning. That's also a big step forward for the future of our programs. So we still made some digital only contents, but they were less ambitious and more video centered. (Zurmely 2018)

Zurmely's words resonate with those of Sandra Gaudenzi, who claimed that interactives could not develop an efficient business model, and therefore the company changed its strategy: produce less complicated interactives and/or more "linear" projects.

Is this a regression, or simply a question of standards? Technologies are developed too fast, and over-experimentation leads to complications when it comes to the responsiveness of "new" media. Big corporations decide on the life of standards and formats, and consequently what will survive. Broadcasters can only keep up with the best option available. The history of interactive practices also shows that there is no set formula to engage or maintain audiences online. The ephemeral and rapid life of many interactives tells us more about how institutions, producers, broadcasters and legacy media are themselves victims of economic systems and market strategies. If these companies want their goods to avoid the trash heap, be re-used and maintain a long lifespan, they must find their own strategies of survival.

## 2.4 Regimes of Obsolescence

In the late nineteenth and early twentieth centuries, emergent technologies such as photography and cinema were referred to as "ephemeral;" that is, something "evanescent, transient and brief." (Grainge 2011, 2) The concept of ephemeral media was later used in relation to broadcast television and the "evanescence" of its content (this was before recording technology). Today, in a "post-network" era, as Paul Grainge observes, "the basis of television ephemerality has changed." (Ibid.) He argues that "clip culture-television is now less ephemeral in the evanescence of programme content but much more ephemeral in the brevity of the promotional and paratextual forms that

surround, mobilize and give meaning to that content" (ibid.). Since broadcasters are now working online and use dedicated websites (ARTE or Al Jazeera, for example) in what ways is the web screen culture of the post-broadcast era ephemeral, and data subjected to what Grainge calls "techno-cultural instabilities?" (ibid.)

Grainge defines two conditions of "ephemerality." First, there is the relationship between "briefness of content" and its "regimes of transmission." (Ibid.) This refers to the abundance of content available and its circulation via formats that face the permanent risk of obsolescence. This format obsolescence is a "techno-cultural instability;" it leads to the loss of material in the communication domain, such as the deterioration of technological hardware, the discarding of content, or the degradation of the signal (ibid.). On the World Wide Web, anything that is new today risks becoming obsolete or deprecated in its next iteration, or n.0 age. As is the case with Adobe Flash, the future of open standards such as HTML5 is equally unknown, as is the fate of formats AR/VR technologies use.

As some of the case studies in this work show, interactives can be seen as "ephemeral media," not because of the brevity of their content, but because of what Grainge calls their "regimes of transmission" (ibid.). This refers to the potential obsolescence of their software and of certain features such as outdated APIs. But obsolescence is also often a question of wide access. Although we cannot easily access some of these media objects using the most common Internet browsers, there are exceptions. In 2017, a group of researchers from the company CloudMosa[33] developed the browser Puffin. They specifically created the software to enable Adobe Flash content in environments that usually do not support it. There are two versions of the browser: one for mobile, and one for PC. They claim that it is the "fastest" browser; it is free to download on Google Play, and already has 80 million customers. It even allows you to access an Adobe Flash website by mobile. Of course, other browsers that use VPNs (so as to mask location and metadata) such as Tor Browser will also work.

33 See CloudMosa 2019.

It seems that these regimes of obsolescence are strictly tied to the standards developed by big corporations and the technological changes they entail. In the case of Adobe Flash, Apple and Google—as the principal developer using the Android system—have more power and more "market share" than Adobe, which specializes in native software development and not on browsers or operating systems. This enabled them to push their agenda. That said, the companies are all members of the W3C consortium, which developed and encouraged the switch to HTML5. Was this war, then, simply a mediatic phenomenon?

Techno-cultural instabilities also certainly affect producers and creators, who often do not keep up with technological development: as some of the examples I introduced before show, certain interactives were developed at a time when Adobe Flash was already becoming deprecated. For instance, *The Migrant Trail* (2014)[34] was released in 2014, four years after Jobs made his famous statement on Flash. Broadcasters such as ARTE archive their material, but cannot ensure that access and the experience itself, especially in the case of interactives, will be the same. Reactivation of these media objects, once outdated or obsolete, require preservation work. However, broadcasters have no control over Internet browsers, and there is neither a large enough profit nor a big enough audience to justify the maintenance costs involved in keeping web pages online.

The most important question is which of these objects should we archive, and which features should we preserve. If they are hybridizations of different media practices such as *Refugees*, should we also archive user gameplay experiences? Should we keep the Facebook extension or does the concept survive without it? Should we re-code and make the experience of the game as it was originally? What if in 20 years HTML5 becomes obsolete? How then do we preserve these media practices?

Regarding the archiving of interactive practices and other web-based media, the force that preservation requires is equally proportional to the drive of "planned" obsolescence. This is itself strictly tied

34 Cf. Chapter 3.

to a constantly changing technology, led by the imperative of novelty within the neoliberal discourse of big corporations that control the Internet.

We can talk about a specific mode of "preserving interactives" as Erwin Verbruggen recently did in a piece published by the Institute of Sound and Vision. He is responsible for the preservation of interactive media at this Institute in the Netherlands.[35] He describes "interactive documentaries" as a "loosely undefined amalgam of works that are represented online, via browser applications or mobile apps." (Verbruggen 2018, 1) His perspective on this "loosely undefined amalgam" pairs with a systemic vision of a media ecology of practices. But, here, preservation work succeeds in bringing them together. Verbruggen argues that both the products *and* the producers represent an undefined industry, which is affiliated with film and documentary festivals. What is certain is that within the term interactives we can separate computer games, interactive documentaries or interactive maps, media objects that make use of social network platforms, and other content related to different websites. Although each object requires different archival and preservation processes—due to differences in software and format—there is a common denominator. They are all accessible online, and they make use of digital code. They are all software that must be made readable for another piece of software (such as a browser). But the difficulties begin from this point.

As aforementioned, interactive practices form part of a dynamic media ecology that remains fluid. In November 2016, during the annual conference dedicated to interactive documentaries at IDFA, a book was given to the attendees which listed all of the names and categories used over the last ten years to define interactive documentaries. The purpose was to highlight the unfruitful search for a "correct" definition. As we

35 Since June 2020 Erwin Verbruggen does not work for Sound and Vision anymore.

have already seen, constant changes in the marketplace make standardisation and generic enclosure of such an object redundant.[36]

Unfortunately, it is exactly this process of storage and categorization that enables us to create a coherent archive. But what does this mean when we talk about a digital archive? Like the *Encyclopedia Galactica* in Isaac Asimov's *Foundation* (1951), archives are no longer only a repository for physical records; they are also digital. The preservation of interactive practices uses similar strategies to those developed for digital art or new media art, which borrowed from installation art and performance art (see Rinehart and Ippolito 2014). However, the preservation of interactives is dependent on some unique institutional and national formations and approaches. Broadcasters sometimes own data storage servers, but they also often rent and outsource their data to third parties. ARTE, for example, uses a third party for its data storage. Further, institutions such as national archives would ideally keep data within their facilities, but it is not always possible. Server locations require very specific temperature conditions, and when institutions cannot produce them, they outsource. For example, although the NFB owns servers it also outsources part of its digital assets. Moreover, storing data means managing it through the use of specific software. The NFB uses MIRIA, which is developed by the company Atempo (NFB 2019). To better understand how interactive practices can resist the regimes of obsolescence, I will now discuss how two institutions deal today with the preservation and archival process.

## 2.5 Preservation Strategies for Interactives: The Sound and Vision Institute and the National Film Board of Canada

In 2018, in Hilversum near Amsterdam, I met Erwin Verbruggen and Jesse de Vos, with whom I had been in contact since 2017. They explained

36 This is also the case with media art. On the topic, see the volume curated by Noordegraaf et al. (2013).

to me how their Institute, which is a national television archive, archives interactives. Verbruggen explained how this issue was first addressed, when, in 2016, during the yearly IDFA Doc Lab, experts met and discussed case studies and potential solutions (Verbruggen 2018).

At that time, they realized that some technologies were deprecated and had become obsolete. Of major concern were interactives made with Adobe Flash, which, quoting Caspar Sonnen, IDFA DocLab's curator, might be defined as "the nitrate of the digital era." (Verbruggen 2017, n.p.) Verbruggen and de Vos made the crucial point that preservation should not only affect and interest archivists, but also producers and creators themselves. After all, the rate of obsolescence in the digital era is growing. The creation of open standards represents a partial solution, and helps avoid the proliferation of too many formats (which is not only a problem of the digital era, as the history of early cinema shows). Once we decide to preserve what we ask first is: what do we start with? What do we want to keep? What do we agree to discard?

The Sound and Vision Institute of the Netherlands proposed a specific preservation process for interactive media objects. They individuated certain combinations of properties[37] that helped categorize these media objects and thus guide selection of the best preservation method. The Institute then proposes a combination of different strategies: technological hardware preservation, migration, emulation and documentation. But, as Jesse de Vos remarks, the archival process is strictly dependent on the financial resources available. These media objects are hybrids, and therefore require "hybrid strategies." (de Vos 2013)

These combined strategies, specifically migration and emulation, are reminiscent of those used in the context of new media art or computer games. If the former adapts the work to a new technology, the latter—which is often used in computer game preservation—provides/ensures the authenticity of the artwork, by operating an obsolete code in an environment which simulates the software on which it once worked. De Vos, in the case of interactive applications, also suggests providing

37 Following de Vos these are "interactive, transmedial, networked, participatory, hyperlinked, immersive, hardware dependent." (2013)

"documentation;" that is to say, important information about the object. He remarks that: "documentation can be done with the purpose of preserving the original socio-historical context of the production and by doing so enrich the experience of users." (de Vos 2013) Hybrid media such as interactive non-fiction practices require thus a "hybrid" preservation strategy. Of course, scholars studying and publishing on these practices are already performing the act of documentation by writing on the subject.[38] Indeed, the many screenshots and descriptions of interactives I have collected may become a repository for future researchers.

The example of the Sound and Vision Institute demonstrates how, despite the initially overwhelming variety of format and shapes interactives take, a coherent, structured procedure helps the preservation process. Verbruggen explained how it follows three paths. First, *document* the work. Second, *capture* or record the assets. Third, *emulation* (Verbruggen 2018). Depending on the project, these strategies might be combined. The goal—or what they hope for—is to emulate, to document, capture and finally produce a format that enables those interested to play or experience the interactive. Documentation means recording interactives as they are used. For instance, "video recordings of someone navigating through the website." (Verbruggen 2018, 16) Further, any kind of paratextual material related to the interactive is considered documentation; this is also the starting point for stages of capture and emulation.

Capturing, in the context of web-based media, means recording a website and its hypertextual links—or their interaction. For interactives, there is a webtool called Webrecorder developed by Rhizome, which is able to record the user's browsing experience. The project Rhizome.org began as a database for media art, and as a collaboration of artists and curators that met at the festival Ars Electronica. It later developed into a digital archive, when, in 2003, it became affiliated with

38 In the interview de Vos discusses the main obstacles to the preservation of interactives: the lack of exact definitions, the lack of standardization of formats together with the high dependency of such objects on the technology used and the legal issues related to licencing (de Vos 2013).

and financed by the New Museum of Contemporary Art in New York. Subsequently, it developed the first open software to save interactive content. Rhizome uses a specific file format to record browsing experiences, called WARC (Web Archive file type).[39] The Webrecorder not only allows you to retrieve and save web content, it also allows you to save interactive and hyperlinked content.[40] Therefore, just like as a still photograph captures the entirety of a moment, Webrecorder saves every link and node. And you can browse the web with emulated older versions of Firefox or Chrome and reach content that is no longer supported/able to be read. That said, it does not always work perfectly. If, for instance, you try to record an Adobe Flash game such as *The Migrant Trail* the image blinks and the sound cracks, making the whole experience quite irritating. Further, it only saves everything if you access every page and play the game in its entirety. As a tool for "amateurs" it is certainly a useful compromise, but for professionals it might not be the best solution.[41]

The process of emulation, typically used for the preservation of video games, entails the re-creation (emulation) of a software environment or an operating system, in order to allow the "obsolete" software to run. As Rinehart and Ippolito explain this technique enables an old videogame to be run on a new operating system (2014, 9).

The Sound and Vision Institute uses a "case by case" strategy, meaning that each interactive is engaged with in its specificity. For video games and interactives, it uses the *Let´s Play* format,[42] letting users record their gameplay experience and upload a video screen-capture

39 See for more info the website of Rhizome: https://rhizome.org/about/.

40 Webrecorder is now to find under the name Conifer-Webrecorder, it requires a subscription to use it (Conifer n.d.).

41 In France, explains Verbruggen, the national archives use specific web crawling tools (bots that independently check the web for website to record) such as Phagosite, because they have to preserve "everything." At Sound and Vision, they instead use an external service called Archiefweb to check for websites and then eventually use Rhizome's Webrecorder.

42 This format started in the early 2000s when YouTube was becoming a widespread platform. It is simply a video-screenshot that documents gameplay. See,

of it. However, the institute often faces problems with copyright, and with the retrieval of every digital asset belonging to a media object. Sometimes, it is simply not possible to provide more than mere documentation.

Institutions, broadcasters and established archives follow a more traditional preservation process. Jesse de Vos explains as much when he elaborates on the policies that determine what is preserved:

> For instance, at the Bibliotheque Nationale de France or the Danish Royal Library they have a mandate by the government to preserve everything that has been published, and this put them in a completely different situation than us. They try to preserve everything and it is not successful, not only because it is very difficult but because there are a lot of limits anyway in the amount of funds really needed. (de Vos 2016)

At the Sound and Vision Institute they focus on Dutch media, or Dutch media makers. As de Vos explains, "we select a lot more, we cannot do everything and therefore we put more our own taste and our own stamp on our collection" (de Vos, 2016). Verbruggen and de Vos also told me that they do not have engineers or software developers at the Institute, and so some of the work has to be outsourced to other companies, such as Archiefweb.[43]

The National Film Board of Canada developed a similar strategy. In October 2019, I met software engineers Jimmy Fournier and Humbert Hardy and software developer Mathieu Sheehy in Montreal. We discussed their preservation strategies, archive and the presentation of several interactive works produced by the NFB in the last decade. The problem they faced was also largely connected to the use of deprecated software such as Adobe Flash. Many interactives were therefore no longer accessible on their website (the NFB has a dedicated website

for instance, the archive of different Let´s Play material under https://lparchive.org/history.

43 See https://www.archiefweb.eu/systeemonafhankelijk/.

and free archive), or they were at risk of becoming so. The NFB is a peculiar institution: it is both a national film archive but is also a producer with an educational agenda. In 2009, it launched an interactive studio (Darveau 2014) and a website that allows every user to stream its films online for free. This new website featured an interactive section that would become the platform for many of the NFB's own interactive productions. However, since then, things have changed to the point that web productions needed to be updated. For this reason the NFB chose the capture strategy and partnered with Rhizome, with the intention of bettering their Webrecorder tool and creating WARC files of all of their interactive work (NFB 2019). Their mission was to make them available again on their website, but this required collecting every asset (every file belonging to each interactive) and capturing the interaction so that it would feel and look like the original.

In order to achieve this goal, the NFB needed to have a proper archival platform that could save the source code, act as a repository for each asset, and then provide a platform to give access to the experience of the media itself. That is why the NFB decided to make use of another software platform by Atempo[44] to collect each asset through MAM (Media Asset Management). Ultimately, the NFB wants to preserve an archive of fourteen thousand linear productions and around 100 interactives that it has produced up until today. The importance given to each asset and not only to the interactive outcome of the productions evidences a specific workflow that envisions interactive media not as enclosed objects, but as processual works. The NFB announced that its new website, which has saved almost 90% of its interactive production, will be available in mid-2020. The different strategies

44 According to the Canadian national website: "Atempo's Miria for Archiving software platform will be a key component in NFB's new multi-site storage architecture and modified workflows. As with the initial developments in 2009, NFB's R&D teams will work alongside Atempo's Innovation Pole to integrate new features to keep valorizing NFB's media assets. One such project is the use of storage analytics to proactively define the best data storage and movement strategies."(NFB 2019)

adopted by the NFB and The Sound and Vision Institute indicate how complex a task it is to preserve interactives properly. The NFB has the advantage in-house engineers and web developers. In contrast, the Sound and Vision Institute archivists often need to outsource work. These differences owe much to differing institutional agendas: if the Sound and Vision Institute is a television and national archive, the NFB not only preserves and produces work, but also acts as a platform for artists. The latter is not interested in preserving interactives that were not created with the support of the NFB, whereas the Sound and Vision Institute aims to preserve what is "of national interest" (de Vos 2016). Nevertheless, the practices of both institutions inform us that, when dealing with interactives, we need to look less towards film history and more towards the history of media art and digital and web art.

Multimedia interactive art—Internet art, for instance—note Rinehart and Ippolito, has disrupted museological approaches to preservation and documentation because of its ephemeral nature. This ephemerality is caused by what I have already termed "techno-cultural" instabilities (Grainge 2013). It is therefore not only related to the obsolescence of this art's multi-layered technologies, but also due to manifold cultural and economic factors. Corporations and Internet consortia such as the W3C (to which major software and hardware corporations belong) also have an impact on the way we store interactive memory for the future.

What the strategies of the Sound and Vision Institute, the NFB, and ARTE tell us is that preservation is still a goal in the archival process, but what to preserve has to some extent changed. Rinehart and Ippolito recall a preservation story at PIXAR. They were advised on the best way to preserve the "end product" of a long process of development. But they knew that this end copy, made potentially of celluloid, would never be as profitable as preserving all the assets used to create the film. They write: "for Pixar, the computer files were more valuable than the film print because, from the computer files, one could generate a delicious variety of versions of the movie that could then be printed on film, but that could not be generated from a print of the film." (Rinehart and Ippolito 2014, 256) They suggest that the best version of a cultural artifact

might not be "the most accurate" but instead the "most fecund." (Ibid.) Preservation should therefore come not from fixity but from "variability." (Ibid.)

## 2.6 Ephemeral, Displaced, Re-Usable. The Future of Interactive Archives

As an example of ephemeral media, interactives are a remarkably revealing case study to help re-think the notion of the archive today. Wolfgang Ernst has worked on a new conception of archive as well as memory. He emphasizes the shift from physical to digital, and argues that access to knowledge itself is changing along with this new storage ability:

> Knowledge in the Gutenberg era, once trusted to an official publication ("Imprimatur!"), claimed to be (in principle) enduring and time-invariant. With the liquidation (fluidity) of electronic publishing, though, knowledge itself becomes a kind of flow, to be nonlinearly and dynamically updated at any temporal instant. […] Digitally saved information can either be read without loss of quality, or it is illegible and hence completely lost. (Ernst 2017, Chapter 6)

Following Ernst, an archive can be conceived as a process, rather than a static thing. Digital archives are "malleable and reconfigurable" and do not need to "conform to the organization structures and systems of traditional archives" (Berry 2016, 4). So how should archiving function? Perhaps the work of the NFB and the Sound and Vision Institute provides us with an answer.

The ephemerality of interactive practices and their regimes of obsolescence confront us not only with the question of what to archive, but a more fundamental concern: should we archive this in the first place? As broadcasters' archives are not always accessible, many interactives go unmaintained because the project funding has reached its end. Archivists are thus in charge of finding out what is to be preserved or *reactivated*. Throughout this process, they should be aware of the contin-

uous effort that is required to combat continuing format obsolescence. Bordina claims that "the only way to ensure a transmission of digital information is monitoring the status of obsolescence of hardware technologies, software applications and formats in which files are stored and provide for the transfer of support or coding in cycles of 7-10 years." (2015, 105)

Maybe the timespan will become tighter. Perhaps standards can help. But institutions need to make use of every strategy available. Preserving interactives means selecting what is worth being saved. The selection process also becomes more dependent on an individual user's contribution; that is to say, it is participatory. Some projects have focused on this unique feature of the web. In 2003, UNESCO developed the platform Archive.org[45] to store and archive digital works. In its statement, it made an emergency call for the preservation of the world's digital heritage. Archive.org's Wayback Machine is software that everybody can use through their web browser to save a webpage, video, photo or a series of photos and other digital files. We can even browse the history of Facebook. But beyond this participatory feature, the institution, which is based in San Francisco, has saved a lot of material like early educational games. This highlights the fact that interactive practices as well as other web-based media are constrained in an archival system that largely relies on "national" institutions. More supranational or transnational institutions are therefore needed. Web archives such as Archive.org, or Rhizome.org should serve as an example for any other public or private actor that works on web-based media preservation and archiving. However, if we transform the Internet into an archive, we need remember that we will have to rely on technologies and search

45 The Internet Archive provides a library of different media that are being purposively digitized and publically shared. Computer games as well as videos and television programs, are being stored as cultural heritage. The "Wayback Machine" is a search engine that let users search a database of websites. Similarly to Google cache, screenshots and content is being saved from time to time and the user can trace the evolution of a website such as Facebook. See http://archive.org/web/.

engines that, as David Berry argues, "make its commodification possible." (2016, 108)

The amount of data available online and its accessibility makes the web a perfect place to archive, yet there will never be a large enough labour force to preserve everything. If technological development is constant, and the amount of data unlimited, how can preservation beat these two forces? Perron and Giordano argue that modern archives are not "physical." Instead, they are "living" or "moving" and they are often made by users themselves (Giordano and Perron 2014, 10). As Ernst would argue: it is now a question of relationships or links. He claims: "the new archive´s task is to meaningfully link up different information nodes—a veritable archive art. Here it is no longer a question of reactivating objects, but of relations." (Ernst 2013, 83)

Indeed, the question that Rinehart and Ippolito make clear in the context of media and software art is that to archive means also to successfully manage different assets, from the storage of source code to the "reactivation" of and access to the experience. The NFB exemplifies an institution that in order to future-proof its assets has decided to build a new software architecture. In so doing, it will both have access to its singular assets, and captures of the interactive experiences themselves.

As we have seen, the individual files which make up the interactives and its source code are seen as much more valuable than the experience itself. If we look back to the economics of interactive practices, we can see why. Their components, or basic building blocks, need to be preserved and archived, but storing the source code—and consequently how these components interact—is a much more difficult task. Using tools like Webrecorder to capture "live" experiences of interactives, we can view its initial incarnation. But this does not mean that institutions, archives and broadcasters will be able to provide access to each singular asset with a view to one day being "reactivated." Instead, these institutions might think about these assets not as material stored in a specific catalogue, but in decentralized and fluid spaces; in other words, spaces which might one day be open to users (but also to potential creators) and thus to participation. Interactive practices encourage us not to preserve something static, but to preserve the "dynamic." If we start

from this perspective, we can reconceive of not only interactive practices, but also media in a broader sense: they are not enclosed objects, but, in a Foucauldian sense, discursive practices. In short, the way we think about media and how to preserve it has much more to do with the process itself than with the media object as final product.

Obsolescence is dependent on a specific economy, which extends globally but does not permeate any place in the same way. Restrictions on content might create virtual boundaries other than economic or mere political ones (in China, access to some content is prohibited by law and even "western" corporations must comply with that). The more the local economy is dependent on consumerism, the more obsolescence will affect commodities. Also, the greater the development of technology, the higher the capacity there is for creating data (and material items) that are disposable. As Peters notes, "Our moment is marked by the odd combination of astronomically large data storage and obsolescence of storage media." (Peters 2015b, 83) But obsolescence marks not the complete deletion of something, but rather a kind of "displacement." William Uricchio, in his discussion of obsolescence within the context of replacing long established cultural behaviours with different new practices writes: "in a self-fulfilling logic, obsolescence provokes replacement and replacement creates obsolescence. Replacement is generally bound to an idea of progress, and to a notion of a discriminating and consuming subject." (Uricchio 2015, 102)

So, it is also about the experience, the re-placing or displacing of something that was once considered as a standard. Interactive practices epitomize this displacement of an established behaviour which is being reconfigured through different narratives, aesthetics and technologies. Some aesthetics remain: think about the Adobe Flash builder and its metaphor of frames and filmstrip. But also think about the aesthetics of Adobe Flash-developed games and interactive practices developed and coded for the web in HTML5.

This chapter has excavated the dynamic, material conditions of the micro infrastructures of interactive practices. Their materiality as software, the infrastructures that enable them to circulate, that shape or encourage changes and format standardization, matter, and should not

go unregulated. But the rapidity of these changes means we have to look at them as processual works, or objects in becoming. The corporate influence on format wars, browsers and standards, highlights the fact that our memories are submitted to the logic of the market. Archivist and producers should first work towards the development of open source standards, and with dynamic software that can be updated, distributed and improved.[46]

Software is a material commodity. The obsolescence of interactive practices is evidence of this. Still, we can learn insightful lessons on how to work with our cultural memory. David Berry suggests looking at how big corporations such as Amazon organize their storage: the company indeed avoids "human-centric notions of archival cataloguing and organization, where one tends to group similar items together" (2016, 110) and has instead created a chaotic system which "functions at the highest rates of efficiency in the retail industry and relies on humans being separated from the act of stowing things and relegated to the role of 'picking' objects as dictated by the computational system. Storage capacity and its cartographies of space are delegated to algorithms." (2016, 110) Jeff Bezos' story might not be that far away from that of Wayne Huizenga, the successful manager of Blockbuster. Isn't Amazon Prime also a video rental service?

I think it is important that the logic of hardware and software waste and disposal does not greatly affect our cultural practices[47]. Hardware and software are subject to the same laws as other consumer products: they end up as waste. Only those that can keep up with current technology will survive (and maybe only for just a few more years). The issues of vast amounts of data and the instability of preservation practices do not exclusively affect digital archives, indeed the question of waste in film studies has been widely discussed (Schneider and Strauven 2015). These discussions show that hardware and software are sometimes not

46 See Verbruggen (2018), but also Rinehart and Ippolito (2014).

47 As Bauman writes, "in consumer-commodity markets the need to replace "outdated", less than completely satisfactory and/or no longer wanted consumer objects is inscribed in the design of products." (2007, 21)

just waste but also rubbish; therefore, there is a hope that they may one day be re-invested with a market value.

With archive digitalisation, dependency on licensed software grows, and this paradoxically enforces the regimes of obsolescence aforementioned. As Perron and Giordano write, the modern archive, that is "fluid and living" and not "physical." (Giordano and Perron 2015, 20) The necessity to keep up to date, the ability to be mobile—all these practices involve processes of "transfer," "migration," and "emulation." This reinforces the nomadic essence and unstable status not only of archives themselves, but of every good and object, and thus binds them to a liquid logic of time.

Despite the ongoing process of obsolescence, archives of digital and interactive media might still be able to unravel time and decelerate the speed of ephemerality. Starting from the production process, preservation should inform every stage of the creation of any cultural artefact in order to future-proof it. If cultural artifacts (including digital media) can now "move ever more swiftly across regional and national boundaries," (Appadurai 2013, 61) commodities such as software formats and web standards—thanks to their interoperability and responsivity—enhance economic globalisation, promising an even greater circulation of ideas and cultural practices. The constant drive to improve or change and produce "novelties"—and its effect on the value of commodities—shortens life span and circulation. Before disappearing, they become digital outcasts destined for waste—unless they can be recycled in the circular narrative of novelty. But what we should do is ensure that they remain as waste, waiting for a new life. As Ernst argue, "data trash is, positively, the future ground for media-anarchaeological excavations." (2006, 120)

Broadcasters and other legacy media were fundamental to the advent of interactive documentaries and practices. As social media's reach grew, they looked for new strategies, such as engagement and interactivity, to maintain audiences and compete on the global market. Still, as the case of ARTE shows, broadcasters were forced to reconsider these strategies and turn back to a more traditional—and proven successful—business model. In this scenario, institutions and archives that

want to keep interactive productions alive face manifold challenges. Indeed, we will be able to keep some web-based interactives from the early 2000s, but we will not be able to keep them all. The dream of Asimov's *Enclyclopedia Galactica* of saving every fragment of human knowledge might be replaced by a simpler line from *Hitchhikers Guide to the Galaxy:* DO NOT PANIC.[48]

48 Adams 2017.