CHAPTER 2

The Myth of the World Wide Web

The structure is everything.
Tim Berners-Lee

2.1 The Birth of the Web: A Hero's Story

On 12 March 2019, CERN, together with the World Wide Web Consortium (W3C) and the World Wide Web Foundation, celebrated the 30-year anniversary of Information Management: a proposal, the paper in which Tim Berners-Lee (1989) described for the first time the Web idea. The proposal, in which the name World Wide Web was not yet coined, represents a watershed moment in digital media history. The proposal has rapidly become the symbol of a revolution, and as the historical proof of the birth of a myth it conveys the constant tension between history and narrative. It is not by chance that the Web's birthday is celebrated on the day of its conceptualization, rather than the day of its actual operation.

In one of his Massey Lectures of 1977, Claude Lévi-Strauss highlighted the particular relationship between history and mythology in contemporary societies. When concluding his lessons, he argued:

> I am not far from believing that, in our own societies, history has replaced mythology and fulfils the same function, that for societies without writing and without archives the aim of mythology is to ensure that as closely as possible – complete closeness is obviously impossible – the future will remain faithful to the present and to the past. For us, however, the future should be always different, and ever more different,

How to cite this book chapter:
Bory, P. 2020. *The Internet Myth: From the Internet Imaginary to Network Ideologies*. Pp. 39–67. London: University of Westminster Press. DOI: https://doi.org/10.16997/book48.c.

> from the present, some difference depending, of course, on our political preferences. But nevertheless the gap which exists in our mind to some extent between mythology and history can probably be breached by studying histories which are conceived as not at all separated from, but as a continuation of mythology. (Lévi-Strauss 2005: 19)

In line with Lévi-Strauss intuition, the history of the Web's birth has gained the status of myth, and documents like the first proposal have become shared symbols, notwithstanding their complexity (and the tedium) of their contents for non-expert readers.

Starting from the first key events of its historical and narrative path, the Web has become the medium that has changed the way people use computers and connectivity to retrieve and exchange information. This radical sociotechnical change happened thanks to a user-friendly, open and intuitive system shared globally. However, the mythical dimension of the Web goes far beyond its technical qualities; the Web also represents the peak of a process of cultural change bound up in the dominant narrative of Internet history. It has become, in a very short time, the symbol of democracy and horizontal decision making, as well as the ideal model for openness and public service media. Symptomatically, the first key event in the Web's history coincided with the collapse of those constraints and boundaries that had divided the world for a long time. Berners-Lee wrote his first proposal for a new information management system in 1989, a few months before the fall of the Berlin Wall. This double happening – the fall of the Berlin Wall and the conceptual birth of the Web – entailed the opening of a new and boundless space where physical barriers would only be simply downsized, but would no longer be perceived as communicative constraints. From this moment on – passing through other key events such as the publication of the first website in 1990; the creation of Mosaic, the first popular web browser, and the Web's release into public domain in 1993; ending up with the commercial use of the Web in 1995 – the history of the Web has come to be an ideal-typical story of a successful, revolutionary innovation. The Web was perceived, starting from the late 1990s, as *the* technology able to change the way in which people communicate, share and learn in everyday life, but it also changed people's role in the construction of a better, egalitarian future for societies.

In the narrative construction of any mythological account, the hero is often a fundamental character. As for other fields such as sports, cinema and war, media history is a reservoir of contemporary heroes who are usually associated with the birth of a key invention such as the radio and computers. Historical figures such as Thomas Edison, Guglielmo Marconi, Alan Turing and Steve Jobs, are clear examples of the double dimension, both mythical and historical, of those characters whose biographical accounts conveyed also beliefs, behaviours, values and principles frequently associated with the social and cultural meanings of their own inventions.

In the case of the Web, the British scientist Tim Berners-Lee represents the figure of the hero: the humble, altruistic, open-minded inventor who decided to give his treasure for free, as a duty towards the good of humanity. Unlike many other heroes of our time, Berners-Lee is depicted by journalists and writers as a low-profile character who does not profess specific rules or collective behaviours (think about the Jobsian 'Stay angry, stay foolish'). However, it is also thanks to his neutral position that the rhetoric of Berners-Lee is constantly associated with the meaning and the role of the Web in our society.

In October 1999, the American journalist Katie Hafner wrote an enthusiastic article in which she promoted Berners-Lee's new book *Weaving the Web*. The piece started with a very indicative claim:

> Berners-Lee, the 44-year-old English physicist who created the World Wide Web, is precisely the kind of hero that a relatively simple invention with profound social and economic consequences should lay claim to. He is not just creative but democratic, diplomatic, polite and generous with credit and praise. (Hafner 1999)

Hafner's introduction suggests that the Web should 'lay claim' to its inventor Berners-Lee; thus Hafner treats the Web as a real and active subject able to dialogue and share positive values such as democracy and generosity with a human heroic figure. This is only one example of the extent to which the Web and its inventor have become two connected symbols embodying an imaginary that was narratively constructed during the very same years of the Web's global spread.

As stressed before, the narrative construction of the Web's myth has been largely based on the story of the first stages of Berners-Lee's invention. Berners-Lee's autobiographical account of the Web's birth at CERN in Geneva has been for a long time the main reference to Web history. This book, along with a list of celebratory events, international awards and magazine interviews, showcased the figure of Berners-Lee, who narrated the birth of the Web in parallel with his professional and private life. In this autobiography, the association between the Web and its inventor surfaces in illuminating ways. When he describes the creation of the first Web browser, for instance, Berners-Lee links the episode to the birth of his child, claiming that 'as amazing as it would be to see the Web develop, it would never compare to seeing the development of our child' (Berners-Lee 2000: 33). The strong connection between the two biographies is also highlighted by external perspectives, as in the case of the book's introduction, in which Michael Dertouzos claims that it 'is a *unique* story about a *unique* innovation, by a *unique* inventor […] he opens a rare window into the way a *unique* person invents and nurtures a *unique* approach that alters the course of humanity' (Berners-Lee 2000: vii, emphasis added). The unified paths of these biographies were essential to conceptualize and frame the Web as a good, egalitarian and revolutionary invention.

From a narratological perspective, if we look in depth at the literature exploring the archetypal structure of narratives and myths, both biographical writings about the Web's inventor, Tim Berners-Lee, and also the biographies of the Web technology, seem to follow quite closely the trajectory of the hero's journey, as sketched in *The Hero with a Thousand Faces* by Joseph Campbell (2004). Ultimately, this narrative pattern provides a familiar framework through which the story of the emergence of the Web has come to make sense to people, contributing to the formation of an imaginary that portrays Berners-Lee's invention as the symbol of a revolution.

In the wake of previous works such as the *Morphology of the Folk Tale* by Vladimir Jakovlevič Propp (1958), Campbell shows how stories and myths from different traditions replicate a common narrative structure: the *monomyth*. As he points out:

> Whether presented in the vast, almost oceanic images of the Orient, in the vigorous narratives of the Greeks, or in the majestic legends of the Bible, the adventure of the hero normally follows the pattern of the nuclear unit […]: a separation from the world, a penetration to some source of power, and a life-enhancing return. (Campbell 2004:33)

Campbell's monomyth provides a useful resource to unveil how stories about the emergence of the Web and its inventor were constructed with the same pattern used for mythical characters. This model helps us also to understand how such narratives are essential to the symbolic appropriation of the values and the features apparently embedded in Web technology.

2.1.1 The Web's Journey

Joseph Campbell's monomyth is based on three main stages of the hero's journey (Fig. 5): the departure or call to adventure, the initiation, and the return or reintegration within society. According to Campbell, the journey, which exalts the figure of the hero, is interpreted as a response to the social need for meaningful stories able to organize and give sense to reality. The hero is thus a character who fills a specific lack of meaning in the social world; he is a bearer of those values that are necessary to keep and strengthen the identity of a community, the cohesion of societies and other forms of social organization. In sociological terms, the figure of the hero serves to fight a specific form of *anomia*, the lack of shared cultural and symbolic guidelines that help the individual make sense of the social world. As Campbell points out:

> The composite hero of the monomyth is a personage of exceptional gifts. Frequently he is honored by his society, frequently unrecognized or disdained. He and/or the world in which he finds himself suffers from a symbolical deficiency. (Campbell 2004: 35)

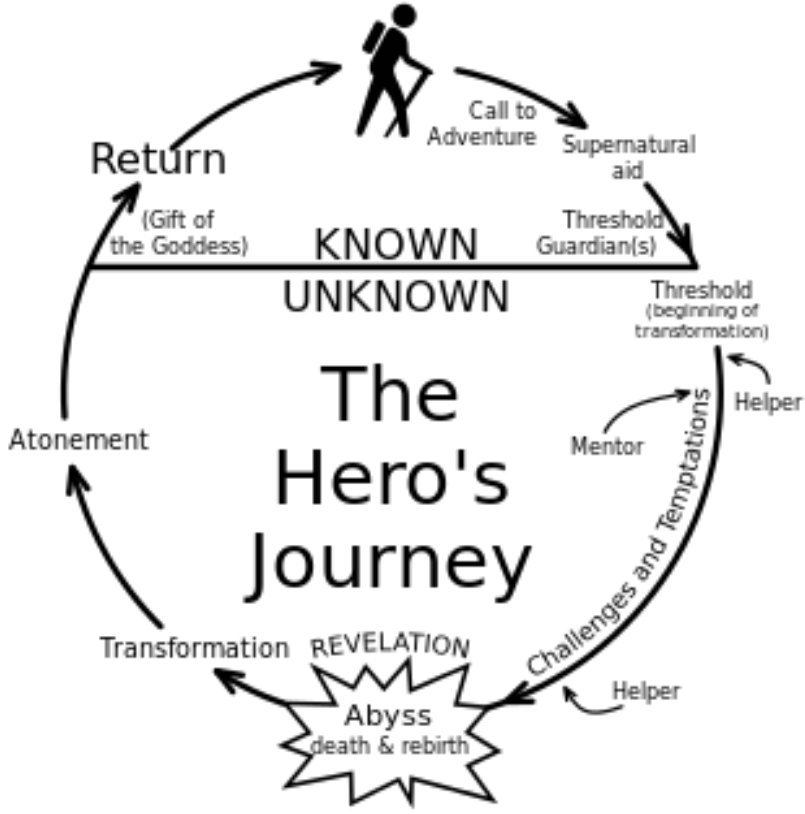

Figure 5: The hero's journey; the basic scheme. (Source: Wikipedia Commons.).

In the case of the Web and Berners-Lee, the three stages of the hero's journey coincide with three phases of the development of the medium, starting from the late 1980s and then incorporating the late 1990s to the early 2000s. The narrative emerging from these steps has been essential in conveying the revolutionary trait of the WWW (and by extension of the Internet at large) as an instrument of liberation from the old, outdated, conservative and constrictive media like radio and television.

a. The Departure

According to Campbell, the first stage in the narrative of the hero is the *departure*, where the hero receives his call to adventure. Through this call, destiny summons the hero, preparing him to enter an unknown space of adventure. Following a pattern that characterizes many biographies of inventors, a call to adventure was foretold in the familiar background of Berners-Lee. His parents were both scientists and worked together on the Mark I, one of the first

computers sold commercially. In his autobiography, the inclination of the young Berners-Lee for computing is directly related to his family; the premature passion for experimenting and problem-solving foretells the destiny of the hero, who since youth had begun to assemble and hack electronic devices such as TV screens and model trains. Also, the first evident symptom of Berners-Lee's fascination with connectivity is identified with a specific anecdote. During a brief discussion with his father, Berners-Lee realized that networking systems would play a paramount role in his life:

> He (Conway, the father *rev.*) was reading books on the brain, looking for clues about how to make a computer intuitive, able to complete connections as the brain did. We discussed the point […] The idea stayed with me that computers could become much more powerful if they could be programmed to link otherwise unconnected information. (Berners-Lee 2000: 4)

Similar episodes establish a twofold representation of inventorship as the result of both predestination and good fortune – a combination of natural gifts, family heritage and chance.[1] Chance is a common element in the biographies of scientists and inventors, in which it often plays a key role, like in the famous case of the Newton's falling apple. The role of chance is essential also in Berners-Lee's biography. For example, the acquisition of the NeXT computer at CERN was a special gift through which his supervisor Mike Sendall encouraged him to work on the Web idea. Through the lens of Campbell's monomyth, the gift of the NeXT computer is the supernatural aid that prepares the hero for his initiation and for the upcoming invention of the World Wide Web.[2]

The call to adventure may coincide with a specific episode, as Campbell points out: 'an event, often happened seemingly by chance, activates the hero's adventure' (Campbell 2004: 53). In the footsteps of Campbell's work, the Hollywood screenwriter Christopher Vogler argues that 'most stories take the hero out of the ordinary, mundane world and into a Special World, new and alien' (Vogler 2007: 10). The new and alien world was, in Berners-Lee's journey, the European Organization for Nuclear Research (CERN), which he joined for the first time in 1980. The new environment is portrayed in mythical tones in Berners-Lee's autobiography, for instance in his description of the control room at CERN:

> Inside were racks and racks of computing hardware, with no lighting except for the glow of the many indicator lamps and dials. It was an electronic engineer's paradise, with columns of oscilloscopes and power supplies and sequencing equipment, most of it built especially for or by the CERN. (Berners-Lee 2000: 8)

The call to adventure characterizes not only the biography of Berners-Lee, but also the biography of the Web itself. Stories around the Web's birth contain several traces of a similar call that prepares and anticipates the destiny of the medium as an egalitarian and democratic system. A lineage of precursors of the Web, such as Ted Nelson's *Xanadu*, Apple's *Hypercard*, the narrative software *Storyspace* and Berners-Lee's *Enquire*, represent a parallel time-line characterizing the Web's story. This lineage is part of canonical histories of the Web (Banks 2008; Gillies and Cailliau 2000: 11–46). Through the reference to a pre-history populated by visionary thinkers (e.g., Bush 1945; Engelbart 1962; Nelson 1987) who imagined the design and implications of technologies and systems yet to be, as well as enthusiastic early adopters, the preconditions for the Web take the shape of a call to adventure that ultimately supports claims about the revolutionary character of this medium. Additionally, as in the case of Berners-Lee's biography, the 'special world' (Vogler 2007: 10) where the emergence of the Web took place is CERN – an environment characterized by some of the same qualities, such as openness and cooperation, commonly attributed to the Web. CERN, a collaborative scientific centre created under the auspices of European cooperation, based in Geneva – 'a city at the heart of Europe with a cosmopolitan heritage' (Gillies and Cailliau 2000: 48) – is represented as the ideal context in which a medium like the Web might originate and flourish.

Notably, this myth of the Web's origins contrasts sharply with the military narrative of the Internet's origins, thus reinforcing the idea of a re-appropriation of the technology by research centres and academics. Hence, the Web's origins at CERN tally with its supposed decentralized and egalitarian character; it was born in an open environment thanks to the effort of a collaborative and horizontal organization, and a mind of genius free to experiment within it. This social sphere represents the principles of sharing and unifying knowledge, expertise and skills for the progress of science and human wealth.

In this context, the constant parallel between anecdotes about Berners-Lee's life and anecdotes about the development of the Web shows how the hagiography of the inventor contributes to the hagiography of the medium. According to this narrative, when Berners-Lee was hired by CERN, some relevant technological events were occurring too. In the late 1980s, powerful new computers like the NeXT were commercialized, hypertext-based software spread in Western countries, and CERN had just decided to adopt the TCP/IP protocol, a keystone for the Web's success but especially the narrative and technological link between the Web and the Internet. Berners-Lee himself claims that, unlike his unlucky predecessors, his creative life coincided with the time in which the Web could finally occur:

> Unfortunately, just like Bush and Nelson, Doug (Engelbart) was too far ahead of time. [...] I happened to come along with time, and the right interest and inclination, after hypertext and the Internet

> had come of age. The task left to me was to marry them together. (Berners-Lee 2000: 6)

Similarly, the emergence of the Web is grounded within a context of social and technological foundations that work to make it seem not only possible, but also to a certain extent *inevitable* (Lesage and Rinfret 2015). The inescapable destiny of the departure, in this sense, is an essential narrative trope for the construction of the Web's founding myth.

b. The Initiation

In Campbell's monomyth, the departure is followed by the second phase, the *initiation*, in which the hero transgresses the threshold to an unknown world in which the core of the adventure takes place. This stage includes the hero overcoming several trials and finally completing his quest, for which he might receive a material or immaterial reward. Translating this pattern into the biography of Berners-Lee, this phase corresponds to the uncertain pattern of institutionalization and diffusion that the new invention took in its early stage. Biographical accounts of Berners-Lee's life underline the struggles and trials he had to endure in this phase. For instance, the CERN community did not immediately grasp the implications of Berners-Lee's idea. A famous anecdote in this regard focuses on the remark written by his supervisor, Mike Sendall, who wrote of the first Web proposal that the idea was 'vague but exciting' (Berners-Lee 1989: 1), thus showing at the same time both enthusiasm and uncertainty towards the project. Promoting the Web at CERN and reducing the real or perceived vagueness of the project was therefore the first trial Berners-Lee and Robert Cailliau—the hero's *ally,* to use another archetypal character in the narrative of the hero (Vogler 2007) – had to face.

In his proposal, Berners-Lee argued that CERN is a 'model in miniature of the rest of the world in a few years' time' (Berners-Lee 1989: 1). The fluid environment of this institution, characterized by the constant exchange of international researchers and the consequent problem of information loss, was in Berners-Lee's narrative an element that also characterized larger challenges the new information society would face. The parallels drawn by Berners-Lee between CERN's organizational structure (which represented a micro-model of the new society) and the need for a new system of information management, pointed out that technological and social change were following a common path, or in other words, that the same biographical transitions would occur both within the media landscape and in everyday life.

Berners-Lee knew that promoting the Web meant first of all persuading expert users to adopt the new system. Hence, beyond CERN, the major step towards the evangelization of the Web was to convince the hypertext community that hypertext and the Internet could be matched and used together. For this reason, in 1991 Berners-Lee and Cailliau attended the Hypertext Conference

in San Antonio. Even though their paper proposal was rejected because of a lack of references to the field, they asked to give a demonstration of their project. At this point, a big obstacle stood in their way: the conference building had no Internet connection. As Stephanie McPherson recounts in her biography of Berners-Lee:

> Several obstacles stood on their way. First they needed a telephone outlet to hook up their modem. (…) They had to dismantle the modem, rewire it, and put it together with a soldering iron. Then they still needed a way for the modem to get Internet access. (McPherson 2009: 59).

Thanks to the hacking skills of Cailliau and to the creative thinking of Berners-Lee, the demonstration finally took place. Beside this key anecdote, other attempts to promote the Web and demonstrate its usefulness are depicted by Berners-Lee as challenging trials, such as stopping the attempt by the NCSA to rename the WWW as Mosaic (Berners-Lee 2000: 70), or the difficult negotiations to acquire the funding and human resources essential for the project. Another key trial was to demonstrate the usefulness of the Web to important players such as editors and publishing houses, convincing them that the Web was not a menace to their role or habits, but rather a tool for work optimization:

> Publishing houses, far from being unnecessary, will be in for very exciting times. Their job and those of librarians seem to have merged into one of classifiers and reviewers of the world's knowledge. (Berners-Lee 1992a: 16)

As in the case of the departure stage, the pattern of initiation can be applied to the biography of the Web as well as of its creator/hero. Narratives of the Web's emergence, in fact, underline the trials and difficulties of promoting the World Wide Web as a functional system, and the fight against opposite visions and scopes in order to preserve the spirit of its founding ideals (see: Gillies and Cailliau 2000: 172–201).

According to Campbell, when the hero completes his quest and his initiation, he might reach an apotheosis that takes him closer to a godlike state – which is, however, never to be fully reached, as the story of Prometheus teaches us (Campbell 2004: 127–147). In the case of Berners-Lee's life, the apotheosis coincides with the sacrifice of his invention's intellectual property. In the last two decades, many authors and scholars have acknowledged the heroism of Berners-Lee. A video interview given by the media scholar Andrew Keen to the website C-Span is a good example of how the sacrifice contributes to the hagiography of the Web's inventor. As Keen argues:

> In my view, Tim Berners-Lee is a hero. He was a typically publicly-spirited scientist who did this out of love. No one was paying him. He

> essentially gave it away. He could have owned the World Wide Web. He could have put all sorts of IP around it and would have become an incredibly rich man, but he didn't. He was very publicly-spirited. (Lamb 2015)

Along similar lines, in an article that appeared in 1997 in *Time*, Berners-Lee is depicted as:

> the unsung – or at least undersung – hero of the information age. Even by some of the less breathless accounts, the World Wide Web could prove as important as the printing press. That would make Berners-Lee comparable to, well, Gutenberg, more or less. Yet so far, most of the wealth and fame emanating from the Web have gone to people other than him. Marc Andreessen, co-founder of Netscape, drives a Mercedes-Benz and has graced the cover of several major magazines. Berners-Lee has graced the cover of none, and he drives a 13-year-old Volkswagen Rabbit. He has a smallish, barren office at M.I.T., where his nonprofit group, the World Wide Web Consortium, helps set technical standards for the Web, guarding its coherence against the potentially deranging forces of the market. (Wright 1997: 64)

As Marcel Mauss has shown in his classic essay (Mauss 1990), every gift bears its donor's identity. In this regard, the sacrifice of Berners-Lee and the gift of the Web to society is a 'personal renunciation that nourishes social forces' (Hubert and Mauss 1964: 102). It is not just a technological transfer; it is also a transfer of meanings and values. The sacrifice is thus an act that reinforces the characterization and the identity of the hero as much as the intrinsic value of his invention. More broadly, the refusal to receive money or any other advantage from his invention, which coincides with the sacrifice of the hero, does not only contribute to the hagiography of Berners-Lee, but also strengthens the analogy between the Web's inventor and the Web itself, which is also portrayed as a neutral space in terms of economic interests and power. In this way, the sacrifice of the hero makes the Web a milestone, a final step in the dominant narrative of Internet history which depicts the final evolution of the 'network of networks' as a horizontal space for information exchange and peer-to-peer production – a sacred gift to society.

c. The Return

In the third and last stages of Campbell's monomyth, the hero returns to his own world:

> The full round, the norm of the monomyth, requires that the hero shall now begin the labor of bringing the runes to wisdom, the Golden Fleece, or his sleeping princess back into the kingdom of humanity, where the

> boon may redound to the renewing of the community, the nation, the planet, or the ten thousand worlds. (Campbell 2004: 167)

This stage might involve new difficulties, as the hero is reluctant to return, or has to overcome further trials before reaching his final goal. In Berners-Lee's biography, the conclusion of the (first) hero's journey coincides with the foundation and governance of the World Wide Web Consortium (W3C) at the MIT in Cambridge. According to its institutional page the consortium is:

> […] an international community where Member organizations, a full-time staff, and the public work together to develop Web standards. Led by Web inventor Tim Berners-Lee and CEO Jeffrey Jaffe, W3C's mission is to lead the Web to its full potential. (https://www.w3.org/Consortium/)

However, in recent times the main task of the W3C seems more to protect the Web from centralization and control rather than leading it to 'its full potential'. Once the Web had spread globally, in fact, new responsibilities and trials emerged as Berners-Lee struggled to protect his invention from new powers threatening the Web's public domain, as well as to preserve the message it conveys through the mythological narrative inscribed in its biographical path. In summary, within the W3C, the hero becomes the guardian of a collective treasure, since the Web has become a common good. Consequently, rather than representing the final stage of the adventure, Berners-Lee's return seems to coincide with a new call to adventure in which the hero, rather than exploring new worlds, has to safeguard his heritage by making people aware of the importance of the Web's openness. Additionally, Berners-Lee's late conversion to the Unitarian Universalist church (UU) – a religious community that lists among its principles the 'respect for the interdependent Web of all existence of which we are a part' (Unitarian Universalist Association, n.d.) – also stresses the new quest of the hero. On the FAQ page of his website and in the final chapter of his autobiography (Berners-Lee 2000: 207–09), Berners-Lee compares the Web and the UU, claiming that:

> Web and the UU concept of faith are similar in that both serve as a place for thought, and the importance of the quest for truth, but without labelling any one true solution. (Berners-Lee 1998)

Covering the same biographical path, the institutionalization of the Web as a global medium goes hand in hand with the foundation of a new supervising institution, the W3C, and the promotion of a religious association, the UU: two different but concomitant expressions of the Universalist vision behind the technical structure of the Web. As Berners-Lee himself points out, 'the parallels between technical design and social principles have recurred throughout the

Web's history' (Berners-Lee 2000: 207); the social principles at the basis of the UU are an example of this theoretical parallel.

As for the other stages in the hero's path, the return phase also applies well to the construction of biographical narratives related to the Web as a medium. Crucially, the preservation of Web neutrality is ensured through a process that involves continuity and change at the same time. In this context, paradigmatic shifts in the conventions and uses of the medium are offered as biographical narratives through which the Web's participatory and neutral ideology is preserved even in the process of change. This is the case, for instance, of the passage between Web 1.0 and Web 2.0, which represents one of the key narratives through which the recent history of the medium has been told and constructed (Cormode and Krishnamurthy 2008). According to such narratives, the shift in the definition of the Web reproduces the same values as its origins, such as authenticity, openness, the relinquishing of control, the sharing of codes and building on the efforts of others. Nevertheless, as authors such as Matthew Allen have shown, the implied values of the Web 2.0 risk turning into a justification of the corporate control over the Web landscape:

> Web 2.0 also serves as an ideology for the creation of new forms of dependence between individual humans and corporations who, by monopolising and controlling the network activities through which key forms of human sociality becomes possible, can therefore benefit disproportionately from that dependence. (Allen 2008)

As an unblemished hero, the Web – especially in its evolved version – risks becoming an unquestionable subject. As a consequence, the supposed co-participative environment of the Web risks justifying the increasing centralized control over information. It is not by chance that in several sequential stories, the hero revered by the people turns out to have become wicked (as in the case of the Web) or, at least, to have lost his former strength.

2.1.2 The Biography of the Web as a Myth-Building Narrative

As the media scholar Peppino Ortoleva has shown (1996), biographies of inventors constitute a standardized subgenre with its own patterns and narrative tropes. The biographies of inventors include recurring anecdotes that help define their genius, while highlighting at the same time the radical change that such figures brought with their revolutionary ideas. Similarly, the story of the Web's birth has been recounted through recurring patterns and tropes coinciding with the life-path characteristic of the hero's journey. As the previous paragraphs have shown, the three stages of Campbell's monomyth – the *call to adventure*, the *initiation* and the *return of the hero* – can be equally applied to Berners-Lee and to the Web. This means that the Web has somehow *internalized*

the life of its inventors and *vice versa*. The overlap between the hero and his creation, in this sense, results in the medium's introjections of its creator's system of value and beliefs. Moreover, the figure of Berners-Lee, who is depicted as an under-sung and humble hero of the digital revolution, amplifies features such as the neutrality and the implicit goodness of the Web, reinforcing its supposed independence, not only from any proprietary power, but also from human agency at large. As a self-fulfilling prophecy (Merton 1948) of a mythological character, the Web has its own destiny, which is written in a future mission to be accomplished. Even the subtitle of Berners-Lee's book (1999) highlights this aspect; it is not by chance that it recounts *The Original Design and 'Ultimate Destiny' of the World Wide Web*.

Generally speaking, looking at this pattern reveals the way in which narratives of the Web have been woven, creating a stable and influential myth in the social imaginary. The imaginary associated with the biographies of the Web, rather than being relegated to the status of a mirror metaphor (Castoriadis 1998), actively contributes to the shaping and institutionalization of this medium in our society; the imaginary is not something stable, but acts as a process of sensemaking rather than as a depository of unchangeable memories. Hence, the Web means something to people because it is narrated in a certain way, and its meanings guide, in turn, the agency of users, programmers, companies and stakeholders concerning the very role of this technology.

The Web would not have gained such influence and agency without a foundational narrative behind it. Myths, even contemporary myths, are often inserted into a specific cosmogony, into a narrative of the world in which mythological stories come in succession, building up a long-term narrative of origins. The Web imaginary emerges in historical continuity with the dominant narrative of Internet history according to which the Web's invention is the culmination of a revolutionary process which started in the 1950s in the United States. From a geopolitical and cultural point of view, the final stage of Tim Berners-Lee's journey is crucial, as it links the life of the Web and its inventor to the mother Earth of the Internet: the United States. Berners-Lee and the Web migrate to MIT and, at the same time, he converts to an American religious association based on libertarian and egalitarian values, the very same ideological framework on which the Web, like the Internet before it, was constructed.

This theoretical link – between the US history of the Internet and the European history of the Web's birth – is well summarized by Berners-Lee himself when he describes the moment in which he decided to move to the MIT:

> It was clear that MIT was very much in control, moving faster, with more experience and relevant contacts. Some people in Europe expressed concern that Web technology would move west, leaving Europe behind. I knew I had to move to the center of gravity of the Internet, which was the United States. (Berners-Lee 2000: 89)

By moving to the 'center of gravity of the Internet', the journey of the Web ends in the very same context in which the dominant narrative of Internet history took place. The role of CERN is no longer considered, since CERN was only a transitory world, a sort of gestation space for an invention that was destined to grow up into its elective environment.

Today, the overlap between the Internet and the Web is so much rooted in the social imaginary that even newspapers, scholars, and opinion leaders tend to mix up the two concepts. But the main focus on the heroic figure of Berners-Lee has another important effect on the imaginary: the personification of the Web. The transfer of values from the inventor to his invention makes the Web a sort of self-sufficient technology, naturally able to shape and horizontalize the social sphere. It is for this reason that the oversimplification of Internet and Web history is dangerous and needs to be challenged through deep scrutiny of its complex and multiple paths. These paths include the history of previous media and imaginaries that shaped the Web's invention. To look at the historical continuity between the birth of the Web and its predecessors such as hypertext programs, broadcasting networks and information retrieval systems is a good way of highlighting the complex intertwining of innovative and conservative features entailed in the so-called 'digital revolution'. To retrieve media history and imaginaries within the Web is therefore a way of looking past its revolutionary aura to question one of the most powerful myths lying at the foundations of network ideologies.

2.2 Questioning the Myth of the Web: Media Imaginaries and Web History

The biographies of both the Web and its inventor have played a paramount role in the dissemination of a linear and clear narrative exalting a new system that has changed social life. The strength of the narrative lies in its familiar trope and its symbolic meanings, but also in its simplicity, self-closure and reader-friendliness; these kinds of stories, exactly like the Web itself, are easy to recognize and internalize, just like fairy tales. But if we look in more depth at the way in which the story of the Web was recounted during and after its invention, the plot is not so linear. In fact, complexity and even contradictions characterize early narratives of the Web. If we look, for instance, at the way in which early accounts of the Web included specific figures of speech (e.g., metaphors and analogies, see Ratzan 2000), familiar and figurative concepts, and old narratives of change and well-known objects; if we understand this pattern of associations we will gain a deeper understanding of how this new medium was integrated into everyday life.

From a media studies perspective, the Web has tended to refer to pre-existing media technologies such as broadcasting, telecommunication and transportation networks, going far beyond a digital networking system. In contrast, from an Internet and network studies perspective, the Web intertwined the assumed

intrinsic horizontality of the Internet with more vertical and hierarchical communicative structures characteristic of other media.

Especially since its global spread, the WWW has been represented by means of powerful metaphors such as the *information universe* or the *human brain system*. These metaphors have been used mainly to convey a message of power: that the infinite potential of the new medium and its universality symbolize a new form of organization and knowledge distribution – a horizontal, neutral technology able to radically reshape information and communication exchange. But before and beside these disruptive and fascinating narratives, metaphors and narratives based on media imaginaries have been essential to represent and describe the early functions and the reliability of the new system. It is not by chance that the first lines of the famous book on the history of the Web written by James Gillies and Robert Cailliau describe the system as follows:

> The www is like an encyclopedia, a telephone directory, a record collection, a video shop, and speakers' corner, all rolled into one and accessible through any computer. (Gillies and Cailliau 2000: 1)

This idea of a *net-metamedium,*[3] – a system able to organize and link all previous media – is at the core both of the Web's invention and its first promotion. Media such as books, telephonic networks, computers, cinema, transportation and analogical directories have all been used by the Web's founding fathers as key metaphors to fix and communicate the identity and the distinctive features of the Web as a medium. Furthermore, as Maria Lindh (2016) has shown, another metaphor has been continuously used to promote computer networks such as the Internet and the Web: the *utility* metaphor has been a constant within Internet-based technologies. In order to facilitate their penetration into ordinary life, net-based media have been interpreted and promoted first of all as utilities, as useful tools able to simplify everyday life rather than as active players in political, economic and social change. Broadcasting media were also seen through the utility metaphor: gas, electric light and especially water networks were used as metaphors to describe the role of broadcasting in bringing information, education and entertainment into the home. The stream of television or radio programmes, according to Raymond Williams (1974), *flows* like water flows, in order that it should be *drinkable* to the audience. Similarly, during its promotional stage, the Web was predominantly depicted as an easy and useful tool for information retrieval, rather than a symbol of a disruptive technological, social and cultural shift.

In line with a corpus of recent works that looks at the relationship between 'old' and 'new' media from a co-constructive perspective (e.g., Balbi and Magaudda 2018; Stevenson 2016; Theophanidis and Thibault 2016), the following paragraphs investigate some key media metaphors used to recount the Web's genesis, and stress the continuity and the co-constructive relationship between the imaginaries of 'old' media and the imaginary of the World Wide Web. These

media metaphors will be analyzed in conjunction with their discursive use – with the objective and ideal readers to whom such accounts are addressed.

2.2.1 Hypertext: The Forgotten Hero Ted Nelson

As is well known, hypertext is one of the key concepts of the Web's structure. At the end of the 1980s, when Berners-Lee started to conceive his idea, the most used hypertext program was Apple's *HyperCard*, which was included for free in all Macintosh machines. The software became a successful interface, organizing databases by means of intuitive graphic links with considerable efficiency. Other hypertext-based programs like *Storyspace*, a piece of software programmed by Jay David Bolter and Michael Joyce in 1987, aimed at creating and reading hyperlinked fiction literature. However, these programs can be considered just part of the Web's pre-history: as Belinda Barnet (2013: 135) points out, a program like *Storyspace* was 'not intended to create networked hypermedia like the texts found on the Web. Arguably, it still belongs to the pre-Web era'. Curiously, although familiar with hypertext, Berners-Lee used this term for the first time in his 1989 proposal when he claimed: 'I first made a small linked information system, not realizing that a term had already been coined for the technique: Hypertext.' (Berners-Lee 1989: 5).

Although Berners-Lee's proposal for the WWW has become a keystone of Web history, scholars have paid more attention to specific elements such as the front page (Fig. 6) and the notes added by his boss Mike Sendall, and have tended to overlook the brief reference list at the end of the paper.

In this short bibliography, the most relevant reference of Berners-Lee proposal is an article written by the inventor of the term 'hypertext', Ted Nelson, probably one of the most controversial and underestimated characters of Internet history.[4]

At the time, Nelson was involved in a very ambitious project called *Xanadu*, a system aimed at organizing and sharing documents by means of bidirectional links. *Xanadu*[5] was the main competitor of the World Wide Web, and it was also the project that had most in common with Berners-Lee's idea.[6] Although Nelson was mainly known for his eclectic and visionary book *Computer Lib: Dream Machine* (Nelson 1987), Berners-Lee decided to quote in his proposal a very unusual paper written by the hypertext inventor in 1967, more than two decades earlier. Nelson's paper was titled 'Getting it Out of Our System' (Nelson 1967), and it remains difficult to find. The reasons for Berners-Lee's choice of this paper are very clear, since it shares a similar subject matter and programmatic questions with Berners-Lee's vision of the future of hypertext. Firstly, the hypertext-based organization of information was, in both Nelson's and Berners-Lee's visions, the ideal solution for the same problem: information loss and the need to re-organize document retrieval practices in specialized fields of research. The following quotes highlight the common goal of the two inventors:

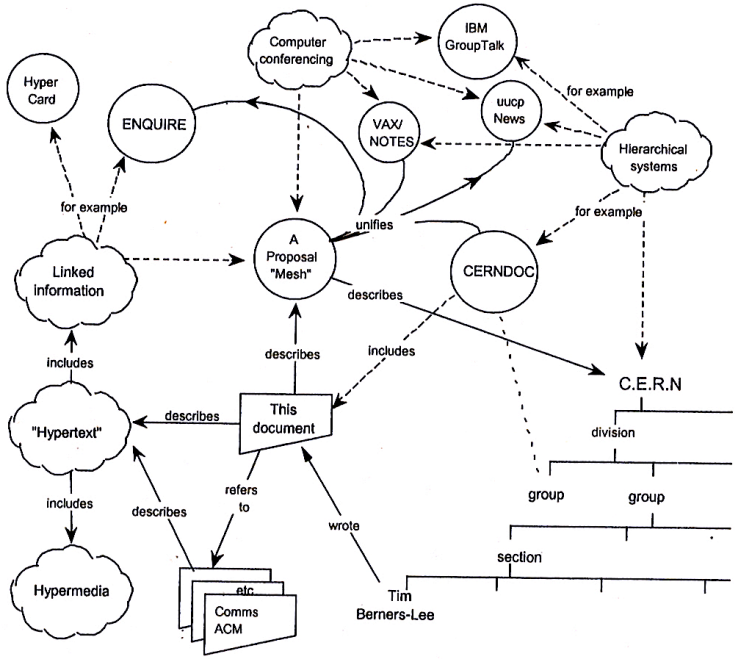

Figure 6: The famous jumping-link model described in the 1989 proposal. (Source: Berners-Lee 1989: 1).

> The information problem I will confront here is the overall question of how to keep specialists informed and updated […] information has been lost, prodigal, or shot down in the bushes. (Nelson 1967: 192)

> The problems of information loss may be particularly acute at CERN […] The aim of the project would be to allow a place to be found for putting any information or reference which one felt was important and a way of finding it afterwards. (Berners-Lee 1989)

Secondly, both papers refer to previous media to describe and forecast the evolution of hypertext systems. From a theoretical perspective, Nelson's writing can essentially be read as a media studies analysis. Indeed, the theoretical framework adopted by Nelson in this paper relies on an analogy between the rise of motion pictures in the first decades of the nineteenth century and the development of hypertext in the mid-1960s. The first aim of Nelson's work was to stress the progressive process of institutionalization and self-definition characteristic of any new medium.[7] By connecting two media imaginaries (the imaginary of cinema and the imaginary of hypertext), Nelson claimed

that hypertext needed to find its distinctive features just as motion pictures had done previously thanks to the seminal work of David Griffith in *Birth of a Nation*. In Nelson's terms any media 'has an internal dynamic, I think, immanent and intrinsic in the technology. This we must discover' (Nelson 1967: 197). Therefore, the systematization of hypertext would be an answer to the 'social need to turn the new machines into information systems' (Nelson 1967: 198), so as to escape from the old system of information organization. Berners-Lee's proposal seems to follow closely the theoretical framework adopted by Nelson. The Web should be 'a superset of most existing and seriously conceivable information systems' (Berners-Lee 1989: 3), and the new hypertext based system, just as for the motion picture in Nelson analysis, had to be based on a list of ingredients old and new that would correspond to the distinctive features of the medium. These ingredients were the blocks the Web would be built on; they represented both the functions and the distinctive limits able to frame the identity, the 'internal dynamic', in Nelson's terms, of the Web. Seen from this perspective the Web was not the result of an epiphany or of the disruptive vision of a genius. Instead, it resulted from both a technical and imaginary systematization of pre-existing media that had been taking place for a long time.

Despite its influence on his own project, Berners-Lee quoted Nelson's paper only in the first proposal. Some scholars have seen this as a clever strategy to depict himself as a mastermind inventor. The Italian scholar Paola Castellucci argues that, in *Weaving the Web*, Nelson was portrayed as the artistic and eclectic inventor of the *term* hypertext, whereas Berners-Lee depicted himself as the inventor of the thing itself (Castellucci 2009: 12–18). This thesis is supported by Mike Sendall, who claimed: 'Ted Nelson had thought about this forty years ago but it was Tim who went and did it!' (Gillies and Cailliau 2000: 201). In other words, depicting Nelson's hypertext as an idea that only he (Berners-Lee) realized, made Berners-Lee seem to be the only innovator able to *systematize* hypertext. This is a narrative often used by inventors such as Edison, Marconi and Steve Jobs, who created images for themselves as clever minds with disruptive ideas which nobody had had before. By hiding Nelson's ideas from their account of the Web's origins, Berners-Lee and his colleagues strengthened the innovative dimension of their invention, making the Web a watershed in Internet history and depicting the new system as something that had never been imagined before. However, Nelson's idea of hypertext was not the only one that predated the Web. Several pre-existing concepts related to other media influenced and took part in the construction and the dissemination of the World Wide Web on a global scale.

2.2.2 Retracing Old Media in the World Wide Web

Besides Nelson's work, Berners-Lee referred to many other media to describe the origins of the Web. First, he listed a variety of software types to describe

hypertext and its basic functions. For instance, in his proposal, he quotes *Adventure*, a videogame released by Atari in 1979 (Berners-Lee 1989: 5). *Adventure* was the first videogame to be based on an imaginary world made of multiple links between different rooms and scenarios that could be freely explored by players. The game plot was based on *Dungeons and Dragons*, probably one of the most successful products of gaming history.[8] But the main precursor of the Web was *Enquire*, which was programmed by Berners-Lee himself in 1980 for personal use. *Enquire* aimed to organize personal records of people and modules by using a link-based system connecting personal information such as telephone numbers, addresses and other information. On his FAQ (frequently asked questions) page, Berners-Lee depicts *Enquire* as the first source of inspiration for the Web:

> I arrived at the web because the 'Enquire' (E not I) program—short for Enquire Within Upon Everything, named after a Victorian book of that name full of all sorts of useful advice about anything—was something I found really useful for keeping track of all the random associations one comes across in Real Life.[9]

As any archivist or historian knows, the organization of information is one of the oldest tasks carried out by media (McNeely and Wolverton 2009), and it is no coincidence that Berners-Lee's invention's first reference is a book, one of the oldest media used to record and re-organize information. Furthermore, the Web's inventor chose one of the most rigorous books for information retrieval, the telephone directory, to make users familiar with the new medium. In his biography, he claims that in the early stages:

> It was too soon to try to sell the Web as the ultimate documentation system that would allow all of CERN's documents, within and between projects, to be linked and accessible, especially given the history of so many failed documentation systems. Small but quantifiable steps seemed in order. Our first target, humble beginning that it was, would be the CERN telephone book. (Berners-Lee 2000: 32)

Telephony has been often used as a rhetorical reference in Berners-Lee's narratives. For instance, he compares telephonic networks to the decentralized structure that facilitated the chaotic growth of the Web:

> Philosophically, if the Web was to be a universal resource, it had to be able to grow in an unlimited way. Technically, if there was any centralized point of control, it would rapidly become a bottleneck that restricted the Web's growth, and the Web would never scale up. Its being 'out of control' was very important. The international telephone system offers a decent analogy. (Berners-Lee 2000: 99)

From a historical perspective, it is no coincidence that telephony has frequently been referenced in the histories of the Web and the Internet; telephonic systems have always played a key role in the development of computer infrastructures. Telephonic cable networks have been the main infrastructure for digital data transmission; public phones were the subject of one of the most famous stories about hacking (Fell 2017: 30); the phone book was the most familiar of directories, and it was the most read book after the Bible. In wider terms, the telephonic system was an ideal conceptual instrument to make the unfamiliar – familiar – to assimilate an unknown technology, the Web, by means of a narrative that was already part of the social imaginary. Telephony is an emblem of user-friendliness, and it is one of the best-domesticated media in Western societies. Furthermore, telephonic systems had already been used as narrative tools to promote new media (for example, the personal computer).[10]

Besides telecommunication, books, directories and motion pictures, the imaginary of the Web is also tied-up with other means of communication such as roads, transportation and postal service networks. By recalling the history of the industrial revolution, Gillies and Cailliau compare two key events related respectively to the industrial and the digital ages:

> The arrival of the web in 1990 was to the Internet like the arrival of the internal combustion engine to the country lane. Internet transport would never be the same again. (Gillies and Cailliau 2000: 1)

In this case, the parallel with the combustion engine is used to stress the revolutionary role of the WWW, a system able to transport information in a new way, just as the combustion engine transported people and goods before; thus old technologies were also used to stress the disruptive power of a 'new' medium depicted as the new *engine* of social change. It is worth noting that the parallel between innovations from the industrial revolution – especially transport and communication – and digital technologies is not only characteristic of the Web; networking infrastructures such as the Italian project *Socrate* have also been compared to industrial innovations such as railway networks by following the common trope of the so-called 'information superhighway' (see Chapter 4.2). In this regard, the constant linking of media technologies with technologies such as transportation highlights the relevance of non-media innovations for media change (Krajina et Al. 2014), not only at the infrastructural and technical levels, but also at the narrative and metaphorical ones.

Another interesting example of the relationship between the Web and pre-existing systems emerges in the description of URIs (Universal Resource Identifiers, now URLs). URIs were, in Berners-Lee's view, the most important ingredients of his invention. In order to explain their functions, he compared them to the zip codes used by the US postal system (Berners-Lee 2000: 39), re-adapting an analogy already adopted by Paul Baran in 1964 to describe the packet switching

process. Indeed, the idea of giving a name (or an address) to any Web page was very similar to the geographic identification, the tagging system, adopted by postal services to identify the final addressee. In this way, Berners-Lee made a new and unknown system based on tags very easy to understand for non-expert users by relying upon a well-known system of information distribution.

It is important to realise that these media were already in Berners-Lee's mind before the invention of the Web and of URIs: encyclopaedias and zip codes were based on tags and numeration long before the invention of URIs, and they could have directly or indirectly inspired Berners-Lee's invention. In this regard, the Victorian *Enquire Within Upon Everything*, the book that inspired *Enquire*, the first hypertext software coded by Berners-Lee, seems to forecast several key terms and features that were at the core of Berners-Lee's idea. In the preface, the book editor wrote:

> Like a *house*, every paragraph in 'Enquire Within' has its number,—and the *Index* is the *Directory* which will explain what Facts, Hints, and Instructions *inhabit* that number. (Kemp 1884: III, emphases added)

As this quote shows, the imaginary behind the Web's naming system had already been expressed in different media systems a long time before. Moreover, several terms used for the Web, such as 'address', 'index', 'directory' and 'house' (a term very close to the 'home' of web sites), had already been used for other media. This persistence of names, images and functional schemes brings out the continuity and the powerful link at an imaginary level between the Web and its predecessors: media such as broadcasting, cinema, videogames, hypertext software, the Internet and telephony, but also other means of communication such as transportation networks and postal services have all contributed to the conceptual framework of the Web. Another interesting point is the fact that the Web and older media imaginaries share several points in common if we look at the narrative of change through which they are represented. For example, to describe the revolutionary power of the Web, Berners-Lee claims that:

> Now that the metric is not physical distance, not even time zones, but clicks, we do have to make these decisions. The Internet and the Web have pulled us out of two-dimensional space. (Berners-Lee 2000: 200)

The geographic narrative of space reduction – in this case the revolutionary power of the Web to change the idea of distance – is probably one of the oldest narratives in media history. As stressed by Vincent Mosco (2004), the death of distances was a trope used to explain and to push for the introduction of telegraphy, telephony, wireless and broadcasting. Moreover, the Web could change geography also by generating new spaces of inclusion (and exclusion), as the motto of the WWW consortium recalled: 'If it isn't on the Web, it doesn't exist' (Berners-Lee 2000: 163). This media ecology[11] idea was used by different

media enthusiasts and researchers in the last century, especially when referring to the power of television to change reality and to influence its audience. Berners-Lee used the same old narratives to present the Web as a new and disruptive idea able to bring 'the workings of society closer to the workings of our minds' (Berners-Lee 2000: 6). This last quote recalls a key body-analogy adopted by Marshall McLuhan to describe the new organization of society: the global nervous system (McLuhan 1964). Indeed, McLuhan stated that the human brain system was extended by another key medium in modern history: the telegraph (McLuhan 1962). Although McLuhan was not quoted in his writings, Berners-Lee acknowledged his fascination with the brain-system analogy:

> The analogy of a global brain is tempting, because Web and brain both involve huge numbers of elements – neurons and Web pages – and a mixture of structure and apparent randomness. However, a brain has an intelligence that emerges on quite a different level from anything that a neuron could be aware of. From Arthur C. Clarke to Douglas Hofstader, writers have contemplated an 'emergent property' arising from the mass of humanity and computers. (Berners-Lee 2000: 204)

In this quote, besides an emphasis on the role of Sci-Fi literature in the construction of socio-technical imaginaries[12], the brain metaphor highlights the importance of a last, crucial reference for the Web imaginary: the network.

2.2.3 The Web and the Network

The network concept is so tied up in the Web imaginary that the two things seem to semantically overlap. Other than hypertext, the most relevant medium on which the Web was constructed is the Internet, and thus it is considered the network *par excellence*. As previously noted, in describing its features, Internet historians have often made reference to the three theoretical models of networks that shaped the evolution of the Internet: the centralized, de-centralized and distributed models designed by Paul Baran (see section 1.4). As authors such as Richard Barbook (2007) have shown, computer networks (and consequently the different models on which they are constructed) have been a staple of the technological and social imaginaries of the twentieth century. Networks' architectures have been incorporated within the 'imaginary of the future' (Barbrook 2007) since the birth of computer science, and they have played an important role at both the technological and political levels (Russell 2014). It is not by chance that the legitimacy and the pragmatic value of each model are still at the core of academic, political, social and cultural debates.[13] Nevertheless, before the Internet, these models had already emerged and coexisted within other media landscapes such as radio, telecommunications and transportation networks.

As with other media, the Web, far from representing an ideal type of distributed communication, tends to hybridize the distributed model at the core of both the philosophical and technical frameworks of the Internet with a more centralized, broadcasting-based one. As Francesca Musiani and Valérie Schafer (2011) argue, 'Internet broadcastization' is a direct consequence of the Web's structure, and it derives from the client-server model that redirects the distribution of information to specific hubs, called servers.[14] From a theoretical perspective, the integration of two different imaginaries, the horizontal ideology of distributed networks associated with the Internet and the dissemination power entailed in broadcasting media, has been essential for the Web's success and its global spread. This is not only true at the technical level: the centralization of the Web is also evident if we look at the importance and the role played by specific hubs, such as Google and Facebook, within the contemporary media landscape. Going beyond the power to centralize information through servers, media corporations have been able to centralize elements such as content access, platform-based interaction, and even the production and the selection of user-generated content (e.g., the so-called 'filter bubble', as outlined by Pariser 2011).

In this regard, the centralization of the Internet also resulted from two constitutive choices (Starr 2004) made by Berners-Lee and his colleagues. On the one hand, the commercialization of the Web – which can be considered an act of *hubris* by the hero – allowed powerful new actors to compete for the monopolization of the Internet. This aspect arose alongside the birth and the diffusion of 'killer apps' such as Netscape, the first widely-used browser. At an imaginary level, this event coincided with the Americanization of the WWW and with the growth of business investments in the digital sector. This happened especially in Silicon Valley, thus in the very same area in which the Web's centralizers such as Google, Amazon and Facebook were and are still based. As Berners-Lee claims in his book, an important step for the Web's success was for it to become a *product*:

> Unlike CERN, NCSA never doubted for a moment that creating products was an appropriate activity […] Andreessen and Clark set out aggressively to conquer the entire market […] The arrival of Web software and services as a commercial product was a very important step for the Web […] Robert and I had spent so much time trying to persuade companies to take on the Web as a product. At last, it had happened. (Berners-Lee 2000: 82)

Berners-Lee clearly recognized the relevance of the Web's commercial use. Digital media companies and commercial stakeholders would play a pivotal role in spreading the new system. It is not by chance that the commercialization of the Web, and the role of companies like Netscape – according to some, the real key to the Web's success – went hand in hand with its large-scale adoption. A few years later, the commercialization process allowed the concentration and

control of content and data in the hands of a few leading actors (Couldry and Mejias 2019).[15]

The result is that nowadays, even if potentially the Web could still be surfed with no dominant path indicators (that is, even if it could be potentially decentralized), digital companies such as Google owe their success to the possibility of concentrating information in proprietary servers and to the missing bi-directionality of the Web's hypertext structure. In fact, from the very beginning Google was created to re-organize the Web in quantitative terms, becoming a hub by ranking each webpage on the basis of the number of links and clicks per each source. Seen from a technical perspective, the mono-directionality of links (the impossibility of *getting back* to the linking source of a webpage) and the client-server models have been essential to the historical transition from the horizontal ideal of cyberspace, characteristic of the 1990s, to the centralization and the corporate dominance of the contemporary Internet. Google was created 'to map' and concentrate the Web by showing relevant sources to users and excluding the 'irrelevant' ones, making them almost invisible; it has reorganized the Web into hyperconnected centres and abandoned peripheries, linked by highways and country roads respectively. The theoretical paradox of the contemporary Web is that, even if it was once perceived as an instrument of liberation, the client-server model has clearly facilitated the dominance of centralizing actors in the market; moreover, the centralization of information into servers has allowed powerful companies to maintain a permanent competitive advantage in the digital market: the more these actors *provide* information to users the more information is *stored*, thus owned, in their proprietary server centres. It is clear that, as Albert Barabási argues in his book on the behaviours of networking systems, these hubs 'are the strongest argument against the utopian vision of egalitarian cyberspace' (Barabási 2002: 58). Hence, the Web has not become the distributed architecture that was imagined, since servers, links and information in general, far from being distributed and controlled by users, are managed and controlled by an oligarchy of dominant companies which are able to filter information (Pariser 2011; Morozov 2011).

The dominance of these hubs in the digital landscape is not only the result of an economic process: the contemporary Internet landscape is also the result of a lack of critical opposition to the way in which the development and the history of the Internet itself have been recounted so far. In this regard, the media scholars Gabriele Balbi and Peppino Ortoleva have taken a tough stance against any *naturalistic* approach to the history of digital media, claiming that:

> […] the way in which digital media are considered in single cultures is historically and culturally constructed and not superimposed, and that Google is not the 'natural' engine for information retrieval. (Balbi and Ortoleva 2014: 489)

Network imaginaries (and the way in which networks *could* work or grow) contribute to the construction and the conceptualization of technology, but they can also hide or overlook those centralizing forces which try to legitimate their leading role in the digital landscape; these centralizing actors (e.g., Google, Facebook and Amazon), usually make use of the very same imaginaries that contest their predominance, if not their actual existence, in the digital media landscape.

If the Web imaginary was based on the idea of an irreversible path towards the distribution and the horizontalization of information, conversely, the history of the Web shows how the new system demanded centralization at technical, political and economic levels in order to be spread and used worldwide. In order to cross the intrinsic limits of a non-mass medium, the Internet, thanks to the Web, has in many ways had to *become* a mass medium, or at least it replicates some key-feature (the vertical distribution and selection of information) of broadcasting media. As this work aims to show, the Web is not an exception; the technical, the political and the social construction of networking structures, content and infrastructures (including the World Wide Web), have always been shaped by the permanent tension between the centralization and the distribution principles or, in other words, by the ideals of openness and freedom and the desire, but also the need, for control. The balance between these two principles of organization is also determined at the discursive, historical and imaginary levels.

2.3 Rethinking Web History

The metaphors, analogies, narratives and models described so far show that, as part of the environment or the 'media system' (Ortoleva 1995) in which the Web arose, media imaginaries played a key role in the conceptualization and the narration of the new medium. In their seminal work on the role of metaphors in ordinary life Lakoff and Johnson claim that:

> Metaphors have entailments through which they highlight and make coherent certain aspects of our experience. […] A metaphor may thus be a guide for future action. Such actions will, of course, fit the metaphor. This will, in turn, reinforce the power of the metaphor to make experience coherent. In this sense metaphors can be self-fulfilling prophecies. (Lakoff and Johnson 1980: 157)

As self-fulfilling prophecies, metaphors and analogies, and in turn the media imaginaries that they entail, have played more than one role in Web history. Firstly, they have been essential for spreading, explaining and making familiar the new system. In fact, media metaphors and analogies related to broadcasting media, books, telecommunications and transportation

networks have all been essential for the symbolic and pragmatic domestication (Silverstone and Haddon 1996) of a new and unfamiliar medium. As the media scholars Philippe Theophanidis and Ghislain Thibault argue in their work on 'media hysteresis':

> So called obsolete media inform more recent ones not just as a reminder of the past, but as familiar references capable of guiding our march toward unknown novelties. (Theophanidis and Thibault 2016: 18)

Hence, familiar objects create an imaginative bridge, a temporal and figurative connection, between the experience of the past and the imminent penetration of information technologies in everyday life. In order to understand the Web of the present through the Web of the past, we cannot exclude the role of other media in our analysis. Rather than treating the histories of different media as though they were discrete, Internet scholars should study the environment in which they were born and have grown over time. The World Wide Web, rather than being constructed on an imaginary island, has been shaped, integrated and constructed (as several other media) by and through the imaginaries of its precursors, neighbours and competitors. Again, historical research is essential for the review of this process. In addition to the dissemination process, the act of describing, communicating and recounting the potential (and thus the imaginary future) of a new medium like the Web is also a way to conceptualize, design and realize the medium itself. Moreover, the ideological power of such visions of the future can also be used by dominant forces to legitimate their centralizing role.

Through a combination of historical research and critical social theory this chapter has stressed two main theoretical points. Firstly, narratives show how stories surrounding the Web's birth have a strong relationship with other, external, but also complementary histories and narrations; pre-existing narrative patterns and contents are constantly interwoven in order to make familiar the unfamiliar, strengthening at the same time the pervasive power of those mental connections that people recognize as elements of a shared world, as collective memories and experiences, as *collective imaginaries*. The World Wide Web has been seen, perceived, but especially *accepted* as something new because it is inhabited by those very 'phantoms' with which it is constantly paralleled. Hence, the Web imaginary, like its *technique*, have not been produced *ex-novo*, but were rather created in continuity with other imaginaries and techniques related to other media, as well as to other social and cultural narrative constructions.

In stressing the importance of the imaginary for innovation, the French scholar Pierre Musso claims that any technological artefact, including the reticular Web, is always both *functional* and *fictional* (see: Garcia 2014: 6); Musso argues that technologies *serve* to do something insofar as they *tell* something to people. In other words, we may argue that technology is always both *useful* and *storyful*; it produces *models* and *meanings* of action at the same time. Authors such as

Cornelius Castoriadis, Bruno Latour and Patrice Flichy have convincingly demonstrated that there is no technology without a *discourse* about it, and we may also argue that there is no valuable discourse without the consciousness of the importance of past discourses and technological artefacts – of what already exists – as well as of their future – what is expected and imagined to come.

To delegate the narrative voice of the Web's history to a limited number of key actors (in this case mainly to the Web's inventor and his narrow intellectual entourage) means to underestimate the multiplicity of narratives and paths that have determined its very meaning and its role. Placing a single inventor at the centre of the discursive stage means to centralize the history and the narrative of the Web, providing a narrow and strictly interpretative model at the historical level. But change is not the result of a single event (in this case the invention of the Web); rather, change, as history, is the result of processes. Whereas an event can be caused by a singular or individual action, processes involve social responsibilities and cultural complexity. This is a key difference between an historical process and self-fulfilling myths: the awareness of the role of multiple factors, in this case the intermedia trajectories and imaginaries, and the importance of specific choices that have driven a technology towards a specific life path.

In a recent interview, Berners-Lee himself has recognized the great importance of complexity and plural histories for a collective understanding of the foundational process lying behind the Web's birth. Even if he keeps the belief that history, as an equivalent of 'destiny', actually chose him to create and protect the Web, Berners-Lee claims:

> History selects people, chooses people to be pivotal in some way, but to a certain extent that's self-reinforcing in that once you get the idea, you have the duty to go and carry it. But also remember that people look at, that society looks at, who is the person? And they interview that person then the name gets attached to it, even though at the time there were lots of other people who had that twinkle and had that sparkle. […] in a way historians with all due respect, can do the world a disservice by only picking out particular people because it makes the history easier to just talk about Benjamin Franklin, Thomas Jefferson. But you have to remember there were an awful lot of people involved. The way ideas transmogrify themselves as they wander through, as they percolate through society is very, very complex. And you're trying to just trace it, you know, just a few threads. I would hope I would be remembered as just a regular ordinary person, totally full of faults just like everybody else. Rather in awe at the process, the sort of this combined creative process, which I have been involved in. (Berners-Lee 2001: 22)

As the Web's inventor highlights, a limited number of sources compromises the possibility of an exhaustive analysis of historical processes; both the

fictional and *functional* dimensions of the World Wide Web risk being impoverished in all the different stages of its path. It is undeniable that societies always have a need for heroes; heroes are reference models, bearers of positive values; they encourage social actions and give people a shared identity and hope for the future. Nevertheless, the transfer and the superimposition of the heroism of Berners-Lee onto a new and predestined technology minimizes the actual potential of human agents to imitate the hero and act independently of technology; in this way technology, conceived as a discourse *intrinsic to technique*, is delegated to act *heroically* in the real world, it becomes somehow self-sufficient.

In order to overcome the monolithic and linear path of the Web, and the ideological consequences of such a partial history, is essential to recognize how this story has been recounted as part of the dominant narrative of Internet history. But, even more important, this history can be challenged, revised and deconstructed in many ways, through a variety of interpretative lenses and thanks to specific case studies (e.g., the study of the multiple local, national, and transnational computer network histories), and by means of alternative, even contradicting, sources. As the next section aims to show, the complex realm of networking histories that led to different forms of network ideologies provides media studies and critical scholars with an essential tool for putting into contention the Internet myth within the contemporary public sphere.

Notes

[1] This anecdote also replicates a symbolic parallelism between the brain system and networking systems that, especially starting from the work of Marshall McLuhan (1964), characterizes media studies in general.

[2] The NeXT computer plays also another important role at the symbolic level: it links the biography of Berners-Lee with the biography of another hero of the digital age, Steve Jobs, who commercialized the NeXT during his 'exile' from Apple in 1990.

[3] The term *metamedium* was coined by the computer scientist Alan Kay in 1977 to stress the ability of computers to simulate any existing media.

[4] For an exhaustive analysis of the competition between Nelson and Berners-Lee, see Barnet 2013.

[5] The literary imaginary has always been at the core of Nelson's thoughts on technology. The name of his software, '*Xanadu*', comes from an idealized place of magnificence and beauty as recounted by the romantic poet Samuel Taylor Coleridge in his poem *Kubla Khan*.

[6] A paper on the functions of *Xanadu* was also presented at the famous Hypertext Conference in San Antonio (Samuelson & Glushko 1991). However, Tim Berners-Lee claims in his biography that the World Wide Web was the only system referring to the Internet presented at this conference.

[7] In describing the process of separation between theatre and cinema as distinct media, the theoretical framework employed by Nelson seems to share several points with the *remediation* theory as exposed by Bolter and Grusin (1999).

[8] In turn, dungeons, like labyrinths, are exemplary models of hypertext environments.

[9] Berners-Lee, T., *Frequently Asked Questions*. Available at: https://www.w3.org/People/Berners-Lee/FAQ.html#Influences (Accessed 20 January 2020).

[10] A few years before Berners-Lee's invention, Steve Jobs compared the imminent success of Apple computers to the spread of telephony in the late nineteenth century. As Jobs claimed in an interview with the US magazine *Playboy*: 'People talked about putting a telegraph on every desk in America to improve productivity. But it wouldn't have worked. It required that people learn this whole sequence of strange incantations, Morse code, dots and dashes, to use the telegraph. […] So, fortunately, in the 1870s, Bell filed the patents for the telephone. It performed basically the same function as the telegraph, but people already knew how to use it. And we're in the same situation today. Some people are saying that we ought to put an IBM PC on every desk in America to improve productivity. It won't work. The special incantations you have to learn this time are "slash q-zs" and things like that. They're not going to learn slash q-z any more than they're going to learn Morse code. That is what Macintosh is all about. It's the first "telephone" of our industry. And, besides that, the neatest thing about it, to me, is that the Macintosh lets you sing the way the telephone did. You don't simply communicate words, you have special print styles and the ability to draw and add pictures to express yourself.' (Sheff 1985: 10)

[11] The media ecology concept entails looking at media as influential environments in which social and individual lives take place. For an overview of the conceptual frame of media ecology according to its theoretical 'father' Neil Postman, see: Gencarelli 2000.

[12] This quote highlights another key issue for the study of the technological imaginary that cannot be analyzed, for space and time reasons, in depth in this work: the extent to which fiction is the result of the narratives professed in scientific production or, *vice versa,* scientific production is oriented and inspired by fiction. I would argue they often co-produce each other (see Bory & Bory 2015).

[13] For a detailed study of the distributed model of the Internet, see the special issue of *First Monday* edited by Francesca Musiani and Cécile Méadel (2016).

[14] On the concept of the Internet as a mass medium see also Morris & Ogan (1996).

[15] Even the new 'Contract for the Web' launched by Berners-Lee to protect and preserve the Web, and to fight digital gaps, inequality and users' privacy needs the support of the very same corporate players (E.g., Facebook, Google) that have long betrayed the Web's ideal. See: https://contractfortheweb.org.