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Three Tales of Dominant Technological Artifacts

Tracing the Paths from Success to Domination of Software Applications with the Help of Latour's Actor-Network-Theory and Bourdieu's Capital Theory

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ABSTRACT

[Domination in the software application industry has been an issue since its early years. But how do these situations of market domination come into existence? This thesis discusses conventional approaches towards understanding market domination and their inherent weaknesses. As a result a new understanding, based on Actor-Network-Theory and Capital Theory unfolds, which achieves the uncovering of a much deeper complexity on how market domination comes into existence:]

Context. How to deal with domination in software application markets has been a looming question over the IT industry. But regulation and interference in markets has also gained increasing interest due to the recent financial crisis. The complexity of markets is therefore still an issue which demands increasing research efforts.

Objectives. This study looks at three distinct cases of market domination: MS-Dos, iTunes and Facebook. All three achieved enormous market power and therefore are used as examples of demonstrating the pathways leading from success to domination in software markets.

Methods. The central methodological approach underlying this study is based on Actor-Network-Theory. The original approach is essentially enhanced by applying Action Net as well as Capital Theory and therefore uncovers new grounds by the combination of methods towards studying the scenarios. The study is largely based on the accounts of actants directly involved in the networks which led towards the domination scenarios.

Results. A better understanding of the complexity inherent in market domination situations is achieved. Additionally the combination of different methodologies under the Actor-Network umbrella is advanced and a pathway to combine Latourian and Bourdieuan thought unfolded.

Conclusions. Domination is a complex construct which emerges out of the complexity of uncountable interactions and translations between the actors involved. This study demonstrated the messiness of these situations and showed how seemingly small incidents can have a huge impact on the path from success towards domination.

Keywords: market domination, software industry, Actor-Network-Theory, MS-Dos, iTunes, Facebook

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1 DOMINATION IN A FREE MARKET ECONOMY

The closing years of the first decade of the 21st Century were marked by substantial market changes. A set of circumstances led to a situation, centred in the United States, which is often framed as the "biggest crisis since the Great Depression" (Pezzuto 2010, p.119). The impact of these changes is still being felt at the time of this writing, and a state of perpetual instability seems to have become the new norm. However, despite the seemingly seismic changes in the market, and the unprecedented policy responses, the absolute parameters of the debate are well described by the economist Rizzo: "The great debate is still Keynes versus Hayek. All else is footnote" (O'Driscoll Jr 2010).This thesis seeks to find new ways of engaging with the economy, such that it might be possible for it to become more than a footnote in the economic discourse. The chosen area of analysis is based around the notion of markets, and specifically how they might come to be dominated; naturally this includes re-imaging what both markets and domination might be and this thesis offers Actor-Network-Theory and Pierre Bourdieu's Capital Theory as a hybrid means of doing this.

One of the problems with creating original ways of thinking about the economy is that the terms of engagement, the language and concepts used to describe the economy and the assumptions that underlie them, have remained the same for many years. The core concept of economic theory, the market, has spread around the world and become a fixed part of contemporary economic discourse. But the market as a discernible notion was introduced far earlier than Keynes and Hayek in the writings of Adam Smith ("The Invisible Hand") (A. Smith 2000). Despite its popularity, the concept of the market has one essential flaw: It requires ideal conditions (Nida-Rümelin 1997). These conditions can be summarized as: a) markets have to be working with a free finding of prices between buyers and sellers, b) there must be enough competition and low barriers for new competitors to enter the market while c) products should be comparable to avoid monopolies. Under these conditions markets should deliver the socially optimal resource allocation (as for example discussed in Arrow & Debreu 1954). Despite the problem of it being seemingly impossible to establish these conditions in a real world scenario, the market idea has enjoyed a long run of success. However, the recent crisis led to increasing attention to the question: What happens when markets fail?

Market failure in the classical sense has been attributed to four distinct causes: a) externalities, b) public goods, c) increased returns and d) information asymmetries (Burda & Wyplosz 2009). While the first two categories deal more with social effects, the latter two have direct ties to the notion of domination. Increasing returns have parallels with Porter's economics of scale in an economic setting (Porter 1998). It thus points to an imbalance when one company can produce goods significantly cheaper, by having a larger impact on networks and actors over another company which is not able to sell large margins. The fourth category is information asymmetries, describing the frequent situation of a seller knowing more about a product than the buyer, a situation that can be especially by the interpretation of not directly involved third parties create a problematic scenario (Akerlof 1970). The concept of the market, combined with these essential failures, lead to a situation in which a company is more readily able to gain market power, thus moving them closer to market domination and monopoly (Burda & Wyplosz 2009).

A core problem with the concept of domination is in defining when a market is still within a state of healthy competition, and when it has been dominated by a monopolist; in essence, defining domination indicators of monopolistic positions within an industrial organization are fairly vaguely defined. Some see monopolistic tendencies as a situation in which "one or several firms do attain high market shares"(Shepherd 2007, p.2), whilst others take a perspective in which pricing is central: "a firm exercising monopoly power over a given market can raise its price above marginal costs without losing all its clients" (Tirole 1988, p.65).

This paper is a quest for gaining a better perspective on markets and the domination thereof. It tries to find answers to the question of a new understanding, by studying a field most representative of the "information age": Domination in the Software Market. The central objective of this paper is to provide insights in to the question: How do certain software applications reach a state of market domination? This is demonstrated by the central case study on MS-Dos as the gateway vehicle for Microsoft's long lasting market success, as well as two more contemporary cases on the pathways to power of the media oriented service iTunes and the social network platform Facebook.

Before approaching the actual cases, I present a review of conventional perspectives on domination in the area of technology. This includes the role of standards and software technology, a presentation of conventional frameworks and perspectives on technology domination. It is followed by a critique of these approaches. As an alternative to conventional attempts Actor-Network-Theory and Capital Theory are introduced which, through their combination, provide a new approach to understanding domination and standards. The central parts of this paper are three cases on MS-Dos, iTunes, and Facebook, and a narrative approach to following their path to domination. The closing remarks attempt to summarise key findings as well as potential areas of further research.

2   THE CREATION OF DE-FACTO STANDARDS

Domination in technology has close ties with the concept of standards. Standards allow one to define the rules and boundaries of a market, and are therefore a highly influential component in defining dominating forces. In their most basic form, they can be seen as the simple decision of compatibility of incompatibility between two components. ISO norms are a primary example of the commitment of multiple parties on a single set of standards.[1] However, standards are not just emerging by unifying agreements; their emergence is from a wide range of different sources. Antonelli (1994) elaborates, within a two dimensional construct, on how standards can be further characterized, with one dimension as Reference/Compatibility and the other as De Jure and De Facto standards.

Table 1: Typology of Standards		
	De Jure	De Facto
Reference	Kilogram	UL/CSA approval
Compatibility	Ntsc,Pal	MS Windows
(West 2003)		

The categories Reference and Compatibility are therefore seen in the former as a form of the fairly narrow fixation on a certain perspective. Standards of Reference can be for example ISO norms, thus the work of an independent industry organization, but also as regulated norms enforced by the government, as for example the metric system.[2] On the other hand, compatibility can be found especially in the area of technology, and interpreted by a variety of factors, such as vendor/product line oriented approaches (Gabel 1987) as well as market strategy oriented factors (Grindley 1995; Damsgaard & Truex 2000).

The classification of De Facto and De Jure standards attempts to separate those standards which emerged from the market, from those which are imposed by a juridical framework. De Facto standards can appear in restricted form (proprietary) as well as in open forms (e.g. open source). In contrast, De Jure standards are usually promoted by a legal body, such as a government or industry/trade associations.

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[1]   The very narrow definition of standards, stated as follows, is therefore contextualized within a broader perspective: "a document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context"(ISO/IEC 2004) .

[2]   But standard does not mean complete universal acceptance. One illustrative example is the metric system, which is far from being a fully established standard, is widely used over Imperial measurements in the United Kingdom (BBC News 2007).

All three cases analyzed within this paper can therefore be seen as de facto standards of compatibility: MS-Dos became the standard dominating the Operating System market for many years, often holding a market share of over 90% (Cooper 2001); iTunes accounts for a 70% market share on the world's digital music sales (Reuters 2007); and Facebook boasts a membership ratio of one in thirteen people around the world (BBC News 2009). Therefore, the phenomenon could be seen as far further reaching than just being standards, and the difficulty of placing them within a clear economic context seems to support the viewpoint that there is further research required to understand the fragments which led to the status quo.

3 "TRADITIONAL" EXPLANATIONS OF TECHNOLOGY DOMINATION

Conventional research on the emergence of domination in technology mainly centres on three distinct subjects: positive network externalities, path dependency & switching costs, and technology lock-in. These appear in varied forms in literature, some of which have only two central concepts (switching costs, network effects) (West 2003), whilst others enhance the concept with notions such as learning theory and inter-organizational structures (Schilling 1999). In the following, the central ideas of the three concepts are presented and critically evaluated.

3.1 Positive Network Externalities

The Network effect is fairly common approach to explain how certain products gain value for individual users in direct proportion to the increased number of (other) users (Katz & Shapiro 1985, Katz & Shapiro 1986). For the cases analysed within this paper, this could be seen as how the value of Dos, iTunes and Facebook to the individual user increases with each additional user. Furthermore it can be seen either as a form of peer-to-peer idea (e.g. the more individual people are using a Facebook, the more a user is able to connect with people), and also as an indirect network effect (Chou & Shy 1990) such as in the form of an indicator for 3rd parties (the more users buy on iTunes, the more 3rd parties are willing to produce complementary goods to that platform; thus it forms a positive feedback loop).

3.2 Path Dependency and Switching Costs

The decision to change from one technology to another is connected to the reluctance to change from an established standard as well as the costs generated by the switching process. These can be either in direct monetary form ("costs"), more indirect forms (e.g. opportunity costs) and include all the related aspects necessary to switch from one product or service to another (Liebowitz & Margolis 1995). For the three cases in this paper it would mean the effort an individual user would have to undertake in order to switch to another system. In the case of Dos, this would include monetary elements such as the purchase of a new operating system, but also the time necessary to install the new system, run the system and gain the same level of proficiency with the system as before. For iTunes it would involve finding a media distribution alternative; and for Facebook joining a new Social Network Site, with all the relevant activities necessary to get the personal network up to the same standard as on Facebook, thus the issues here are largely related to learning and discovery.

3.3 Technology Lock-In

The aspect of technology lock-in stands in direct relation to switching costs. It includes precautionary measures by the provider of a certain service or product to artificially raise switching costs, thus making competing products less attractive to the customer (Arthur 1994)[3]. For the technology market this could

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[3] For example Microsoft was accused of following an "embrace, extend and extinguish" strategy, meaning first joining an open standard but later improving the

be seen in the compatibility factor (hard/software) as well as file formats. For Dos, one example would be getting 3rd party software providers to develop exclusively for Dos; for iTunes in digital rights management aspects, which lock media files for exclusive use within the iTunes software; and for Facebook in the ability to log-in on many other sites using Facebook log-in information ("Facebook connect").

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standard and establishing the new standard in a proprietary form (US Dept. of Justice 1999).

4   CRITICAL EVALUATION OF MAINSTREAM APPROACHES TO DOMINATION

The approaches considered so far do not come without substantial problems. The following discussion summarizes the core weaknesses in these with regards to their ability to cope with challenges related to the subject of domination.

4.1   Positive Network Externalities

The criticisms against Positive Network Externalities are mainly directed towards two aspects: the existence of the principle, and the consequences of the idea. Liebowitz and Margolis argue that typical positive network effects could be identified in products which do not have network externalities at all, thus making it difficult to determine in how far the growth can be attributed to network effects itself or to other factors, such as a superior product. As an example, they argue that the financial software Quicken enjoys tremendous success on the market, yet there are no obvious signs of network effects (e.g. a directly related benefit for one user when many others are using it) (Liebowitz & Margolis 1998). On the other hand, empirical studies such as those of large computer systems (Tam & Hui 2001) as well as of personal computer standards in Japan (West & Dedrick 2000) come to conclusions that reject the idea of existing positive network externalities in these areas.

One criticism of the theory itself is the main assumption that more network participants raise the value for individual users. This solely quantitative orientation is problematic because it does not evaluate the value of the individual contact itself. This would, for example, attribute a higher value to a telephone book over the telephone list of personal contacts (Harengel & Haxhixhemajli 2011). Beckstrom's Law (2009) attempts to take up this aspect and sees a reverse effect of network externalities. Beckstrom illustrates this on the example of Bill Gates joining Facebook and his quitting of the network soon after. The reason Gates gave was, that he received massive amounts of requests from users to become part of his network. Thus by each person joining Gate's network, the value of the network, and ultimately the value of Facebook, declined for Gates (Buley 2009). The case of Social Network Site "Orkut" is a larger scale example; the network lost a substantial amount of users over after an over-proportional number of new users from a particular geographic region joined the network.[4] Others, such as Rushkoff, see the problems of the Positive Network Effect idea as much more fundamental. In his interpretation, network effects are the foundation of any pyramid or ponzi scheme since growth is in some form always limited (Rushkoff 2000).

4.2   Path Dependency and Switching Costs

The case for path dependency and switching costs is far less controversial than the case for positive network externalities. This might be largely due to successful studies demonstrating the effect, such as those on mainframe computing (Greenstein 1993) and workstations (Heide & Weiss 1995). The main criticism is therefore more directed at the concept itself and in how far it is an inefficient outcome. One of the most popular examples of the concept is a

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[4]   The Orkut example is further discussed in the Facebook case study.

common target of dispute: the QWERY keyboard. The essential conflict started with the assumption that someone new to typing on a keyboard can learn to type faster by using a Dvorak keyboard over the now standard QWERTY keyboard. But this conflict resulted in an endless discussion going far beyond the simple issue of the keyboard (Noyes 1983; Hossain & Morgan 2009). The dispute became a fundamental conflict on how to cope with sub-optimal outcomes of standardization. Fundamentally the blame game is again ideology driven; either by the Keynsan viewpoint, proclaiming that a standard should have been set by a government body; the (Neo) Classical perspective, that the market should have led to the optimal outcome; and a position somewhat close to the Austrian School of Economics, that a perfect standard idea is irrelevant since reality determines the standard (Lewin 2001).[5] In contrast, it has been argued that the dissatisfaction of consumers having entered path dependency can lead to a strong force breaking the dependency (Burnham et al. 2003). Examples of this can be seen in Open Office or Firefox, as direct results of exit strategies from rising switching costs and path dependency pattern.

4.3   Technology Lock-In

Due to its essential influence on path dependency and switching costs, the technology lock-in issue has become predominantly apparent in a judicial context. Thus judgment of the strategy seems to be seen as existent to a certain degree. In fact, two of the three cases analyzed faced allegations of Technology Lock-In: MS-Dos (Schilling 1999) and iTunes (Sharpe & Arewa 2007), while some are already speculating on this issue with regard to Facebook (Whitcomb 2010). Thus the concept of technology lock-in is seen as existent, and also as the least controversial of the three themes. Of course, it has to be mentioned again that the actual value judgment and in how far these produce unwanted results are again open to the economic perspective taken by the disputant.

In summary it can be said that all three categories are indeed valuable concepts with certain weaknesses and strengths. What becomes apparent is that each perspective picks a very distinct attribute and tries to reduce domination as a direct result (or the combination of these factors). Callon harshly rejects this notion by explaining: "I don't think that norms, values and conceptions of the world can be made autonomous in order to establish them as intermediary variables through which abstract economic theories could act upon real economic agents"(Callon 2005, p.13). This view of domination as a simple cause and effect relationship stands in sheer contrast to both Actor-Network-Theory and Capital Theory. Both perspectives follow very distinct approaches in reflecting the complexity inherent to market situations and the domination thereof, and get closer to what Callon describes as "The challenge for the social sciences is not to attain knowledge that provides a frame into which the actors fit and that indisputably imposes on them the definition of true and false and hence of good or bad. The challenge is to enable all the differences to be deployed, and to be attentive to the conditions allowing their comparison and evaluation" (Callon 2005, p.12).

In his seminal article on the subject of social embeddedness of markets, Granovetter points at the challenges of the complex power relationships leading to domination in a market (Granovetter 2008). These power relationships have

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[5]   The discussion is mainly led by the protagonists Liebowitz and Margolis (1994, 1995) on the one side and David (1985, 1986) on the other. The inherent irony of the conflict and its stages is summarized in Lewin (2001).

played a central role in the emergence of Actor-Network-Theory (Latour 1996, Latour 2005). However, in the context of this paper the struggle for power is enhanced by Bourdieu's Capital Theory. This allows one to contrast the imbalances of networks beyond the actor-actor relationships, and thus uncover what is described by Bourdieu as "a force inscribed in the objectivity of things so that everything is not equally possible or impossible" (Bourdieu 2008, p.249). By combining both approaches it becomes possible to not only describe the processes taking place in the formation of networks, but also to discover the inherent imbalances of their existence.

5 ACTOR-NETWORK-THEORY

Actor-Network Theory (Ant) is a social constructivist approach with its roots in the writing of French philosophers Foucault and Tarde. It has been established as a scientific concept by core writings of Latour (1987) and Callon (1986b) as well as Law (1986). Over the years the theory attracted a quite broad following in academia, spreading Ant into a wide range of different subjects. Many of the elements surrounding Ant are characterized by a very vague framework. It might be best characterized by Latour's rejection of the term "Actor-Network Theory" because every part of it is wrong (Latour 1999) and the retraction and affirmation that every part of it is correct soon afterwards (Latour 2005). Although this could be seen as some form of self-irony, many aspects of it are still very "flexible". In earlier writings the Ant concept was described as a "Sociology of Translation" (Callon 1986b, p.68) and an "Actant-Rhizome Ontology" (Latour 1999, p.19), both of which were later rejected for essentially stylistic reasons. Despite certain arguably inconsistencies, Actor-Network-Theory has gained a broad following in Academia. In fact exactly this interpretative freedom could be seen as one of the core reasons for its success. Still, certain core concepts and assumptions of Ant have been established on which the following parts strongly draw on. Among those are the roles of "actors/actants", "networks", "translation" and approaches towards a "Post-Ant" perspective.

5.1 The Actor and Actant

A central element characterizing Actor-Network Theory is the equality between human and non-human actors. The aim of this is to reflect the complexity of real world scenarios, where human and non-human elements interact in a continuous sequence of exchanges. The emancipation of the non-human as an equal participant is one of the core objectives of Latour's work, a topic extensively elaborated in his writings on "The parliament of things" (a form of representation of non-human interests by humans) (Latour 1993; Barron 2003; Latour 2005). This fosters a perspective in which nothing should be treated an isolated incident, but everything embedded in a collection of interplays. This objective, to overcome the traditional sociological dualism between human and non-human actors, is a central element of the Ant approach (Callon & Law 1997).

To avoid the humanized association with the word "actor" the term "actant" is introduced to be representative of both human and non-human actors (Latour & Akrich 1992). An actant can represent a wide variety of different things, for example Latour offers structural traits, corporate bodies, and individuals or aggregations of individuals as examples (Latour 2005). To adequately reflect the equality of humans and non-humans for the following discussion, the term actant is used. Each actant is seen as a network-like character, an aspect which is further elaborated on in the next part.

5.2 The Network and Action-Net

The essential attributes of networks is their "heterogeneity", meaning they are formed by a collection of multiple actants, or as Law mentions at one point "any material that you care to mention" (Law 1992, p.381). The understanding of the term "network" here is substantially different from the classic "connected dots" network, or network from a technological perspective. The essential part of Ant Networks is the negotiation and meditation, which makes every network

participant an active mediator. The essential problem of defining the scope of the network is based on whether an actant makes a difference (Latour 2005), thus shifting the focus towards a heuristic understanding of networks. Czarniawska overcomes the ambiguity of the network term by introducing the "Action-Net". An Action-Net assembles all actants which are "necessary for a given activity to take place" (Czarniawska-Joerges 1996, p.67). She differentiates action nets from networks by emphasising an inherent perspective shift. While traditional networks were focused on the individual participants, action nets have a greater robustness by surpassing individual actants due to their durability. This leads to a shift were actants do not define the network, but the identities of the actors are formed by the actions within the Action Net (Czarniawska 2008). In an attempt to reflect this idea, the action-net approach is followed in the following parts of this paper. On this topic it should be further noted, that each actant is embedded in countless further action nets, and is in itself a network-like structure (Latour 1996).

5.3   The Translation and Innovation

As already elaborated in the previous section, each actant negotiates with others. Latour describes this process as "a relation that does not transport causality but induces two mediators into coexisting" (Latour 2005, p.108). The term originally appeared in the context of Michael Serres philosophical viewpoints, and is an essential construct for interpreting innovation from the Ant perspective. Preceding any innovation is a chain of countless translations between actants, or as Callon elaborates "Translation involves creating convergences and homologies by relating things that were previously different" (Callon 1980, p.211). These interactions lead to the creation of agency, and in how far these interactions are created and stimulated by the involved actants is seen as the essential success measure for emerging innovations (McMaster et al. 1997). How and what actually creates and stimulates this process is very vaguely summarized in the intention of "interesting others", which Latour describes: "The work of generating interest consists in constructing these long chains of reasons that are irresistible, even though their logical form may be debatable" (Latour 1996, p.33).

From the above discussion, we see that any innovation can be viewed as a result of the translations taking place between actants. This is consequently a strong contradiction to the traditional hierarchical approaches to both innovation theories (Adoption/Diffusion) (Rogers 1983) as well as to the stereotypical genius assumptions. Reflecting the complexity and wealth of innovation networks leads to the problem of how to deal with this enormous collection of data (i.e. the "lonesome" genius required a complex network of actants; for example documents, colleagues, and instruments, which all contributed to the final result). The solution offered to overcome this problem of complexity is "black boxing", meaning to treat a network of actants as a single actant (Harman 2009).

In this form, the approach of Ant is substantially different from traditional approaches to innovation. In line with the rising criticism against the dominant innovation paradigm of Rodger, Ant aims to offer an alternative. Indeed, some research sees a reflection of colonizing mindset in Rodger's approaches, thus he appears to make innovation an artificially forced process (McMaster 2001). Table 2 gives an overview of the different perspectives between Rodger's Diffusion Theory approach and of Actor-Network-Theory in regards to innovation.

Table 2: Adoption Diffusion Translation Comparison			
	Adoption Perspective	Diffusion Perspective	Translation Perspective
Hierarchy	Bottom Up	Top Down	Chaotic
Initiator	Decision of the Individual	Top Management, Consultants	Complex Network without "original movement", Meta Ideas
Spreading (ideal)	Similar to the Gaussian Distribution	Resistance Free	Resistance means more Energy
Change	Depending on the Initiator	Avoided	Necessary and Invited
Modified version of Czarniawska (2008, p.89)			

The phases are based on those proposed by Czarniawska (2008, p.89) and were enhanced by including the adoption perspective as well as the hierarchical implications. Despite Diffusion and Adoption both being part of Rodger's model, it seems reasonable to illustrate the difference, which leads to a diversion from the pure top-down approach. Although the bottom-up perspective itself acknowledges the importance of the end user, it is still more a process of influence (e.g. identifying opinion leaders, segmenting different adoption patterns) than a democratic process.

5.4   Beyond Actor-Network Theory? The Post-Ant Movement

In recent years, various attempts were made to overcome the suggested weaknesses of the Ant approach, which were consequently summarized by adding the popular prefix "post" to Ant. The central work can be seen in the book "Actor-Network Theory and after", which featured contributions by authors such as Latour (1999), Callon (1999) and Law (Law 1999) . The problems with declaring a "post-ant" dictum are inherent in the holistic perspective of the Ant construct itself. By doing research from an Ant perspective, researchers themselves become participants in the networks they are researching. This results in a two way relationship; at the same time as Ant is being applied differently by each researcher, Ant itself is being shaped by the wide range of different approaches taken by different researchers. Thus, defining a clear Ant and post-Ant would be a contradiction to the concept itself. This argument of Ant evolution is supported by Whitley and Rukanova, who see post-ant as mainly a "more sophisticated" approach to the "pragmatic" earlier approaches (Whitley & Rukanova 2008, p.1120). This is also reflected to a certain degree in a paper by Schwanen, who does intentionally not differentiate between Ant or Post-Ant perspectives, and consequently uses the term "(post-) ant" (Schwanen 2007).

A number of detached attempts have been made to establish a post-ant. Examples thereof would be case studies of Open Software by Darking & Whitley

(2007) or of a Push-Pump in Zimbawe by de Laet & Mol (2000). In an attempt to summarize the post-ant approaches, Gad and Jensen state that post-ant aims at "including everything" (p.6) and to recognize that "research is also an actor" (p.6) and further that "The researcher has the opportunity to translate insights, which have been obtained through scholarship, training and empirical study."(p.7) and conclude "that post-Ant is relatively indefinable"(p.16) (Gad & Jensen 2009).

Consequently, the implied critique against traditional Ant is that the "neutrality" of any researcher is an artificial construct, which is not possible to achieve in a real world research setting. Thus, the idea of a "neutralized" researcher, which is expressed by core statements of Ant research ("follow the actors" (Callon 1986a, p.4). and "let the actors speak"), is not realizable. One could see Latours recommendation of "let the actors have some room to express themselves" (Latour 2005, p.142) as an attempt to soften up the strong actor centric approach. But this discussion highlights the underlying risk of any qualitative research and is by all means not a new development. The inherent conflict can be traced back to the "Werturteilstreit" (Value-Dispute) of Sociology between Max Weber, Werner Sombat and Gustav Schmoller in 1909 (Nau 1996; Ciaffa 1998) or even further to Vico (1979). Even Weber himself had to admit that "There is no de-facto objective, scientific analysis of cultural life or... of social phenomenons independent from special or one-sided viewpoints, which determined openly or silently, intentionally or unintentionally - the way research objects are selected, analysed or categorized" (Weber 1991, p.49)[6]. Thus it has to be acknowledged that any researcher is an actant within the research network - but one among countless others. And by writing these words the text itself emerges as a new actant, which negotiates which each individual reader a personal form of translation.

5.5   Why Actor-Network-Theory Needs Enhancement

In the past Ant has been applied in countless studies on the emergence and existence of networks and their actors. But one central aspect becomes apparent when taking a closer look at these studies: The contributions of Actor-Network-Theory cover only a descriptive perspective - in fact Law goes so far as to question if Actor-Network-Theory is rightfully using the term "theory" since it doesn't even intend to explain anything (Law 2009). The purely descriptive nature of Ant makes it ideal to view networks from a story perspective. This puts significant pressure on Ant since there exists, even from high profile researchers, a certain disappointment in the "results" from non-Ant researchers (Czarniawska 2008).

This perspective is founded on the understanding that Ant, as a non-result oriented method, is based on the inherent complexity and messiness of networks. While this approach is therefore adequate to describe that there are networks within a market, the quest for how domination occurs is not possible to answer satisfactorily. In order to unfold the emergence of domination, it is necessary to not only describe, but also explain, what is going on. Admittedly this is a dangerous area to approach and in some ways problematic in order to fall not

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[6]   My own translation - in the original - "Es gibt keine schlechthin "objektive" wissenschaftliche Analyse des Kulturlebens oder .. der "sozialen Erscheinungen" unabhängig von speziellen oder "einseitigen" Gesichtspunkten, nach denen sie - ausdrücklich oder stillschweigend, bewusst oder unbewusst - als Forschungsobjekt ausgewählt, analysiert und darstellend gegliedert werden."

into the trap of a social critique perspective, as it has been unfolded during the conflict between Callon and Miller (Callon 2005). In this paper the standpoint of Callon, who considers that "social scientists don't have special access to a truth that would be inaccessible to actors themselves" is followed, but at the same time it seems necessary to spotlight the imbalance between actors and the networks to which they are connected.

For this purpose, Bourdieu's Capital Theory (2008) is introduced as an approach to explain these imbalances. The choice of Capital Theory is made with the following objectives in mind: 1) Capital Theory allows the messiness of a narrative to remain intact. It does not try to squeeze actors into certain frames, but rather explains certain attributes they possess, which have impact on the networks. 2) Capital Theory makes no attempt to provide a uniquely true statement. It simply introduces a larger perspective beyond the single network perspective, and thus includes elements of other networks which impact the network under research. 3) To compensate for the lack of Actor-Network-Theory in not only describing how networks come into existence but also in explaining why they come into existence. Translation has already addressed the aspect from a communicative standpoint, but with Capital Theory it becomes possible to describe not only the interaction but also to explain certain attributes of why and when actors start to subscribe to translation and on what basis they make them their own. In order to understand the value of Bourdieu's Capital Theory the following discussion presents the different capital forms, paying special attention to the potential conflict emerging through the combination of Actor-Network-Theory and Capital Theory.

5.6   Bourdieu's (Extended) Capital Theory

The prospect of a world of different capitals is rooted in Bourdieu's critique on the overtly strong orientation on capital in a monetary form. The idea of monetary capital is in many ways still active in social science concepts (including Beckstrom's Law, discussed earlier, which is improving the pure quantitative evaluation, again moving towards a monetary quantification of networks) (Buley 2009). In the recent past, attempts have been made to understand economy as a more complex structure. Unfortunately, the attempts to replace traditional concepts with new approaches follow a similar narrow view which they first set out to dismantle (e.g. experience economy (Kostera & Hjorth 2007)).

A similar objection could have been made towards Bourdieu and his narrow view on his "classic" four capitals (economic, cultural, social and symbolic capital). This view was rather limited, and Bourdieu's reluctance to extend it and include, for example, technology aspects have been criticized (e.g. Hillebrandt 2002). In one of his very last works[7] he finally enhanced his capital with four further forms (judicial, technical, organisational and commercial) and substituted economic capital for financial capital. This was done with a distinct orientation towards economic theory, and elaborated on how an actor interacts within a market and gains domination - therefore the ideal prelude to the situation analyzed in this paper.

In Bourdieu's own words, these additional capital forms are described as follows: Financial capital is "direct or indirect master of financial resources", technological capital the "portfolio of scientific resources or technical resources",

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[7]   Bourdieu died in 2002, the book was first published in 2000 under the title "Les Structures sociales de l'économie" (Bourdieu 2000).

Commercial capital the "master of distribution networks, marketing and after-sales", Social Capital the mobilization and relation of these resources, symbolic capital the "symbolic resources based on knowledge and recognition" (goodwill, brands etc) (Bourdieu 2005, p.194). Cultural Capital consists of education, but also includes a traditional "Kultur" understanding (e.g. Literature (Bourdieu 1983); Organizational Capital, which was very rarely mentioned in Bourdieu's writings at all - besides a note that it includes "information about the field" (Bourdieu 2005, p.194) - is never further described by him, as well as Judicial Capital, which he saw as an "objectified and codified form of symbolic capital" (Bourdieu 1998, p.47) which were essentially oriented towards any juridical related elements (e.g. lawyers, courts, laws).

Moreover, Bourdieu understands the different capital forms as determined by their "volume and structure" which consequently determines "factors of success (or failure)" (Bourdieu 2005, p.194). Thus the perspective followed in the cases comes from a meta viewpoint, trying to capture the structures in their entire complexity. Specific elements are singled out only for exemplary illustration of the larger dynamics. In the following section, the subject shifts further towards bridging Actor-Network-Theory with Capital Theory and therefore enhancing both concepts on essential parts.

As a warning it should be pointed out that this paper can not to justice to the demands of an in -depth analysis of the cases by Bourdieu's theory. Doing this would lead to extreme complexity. Even apparently trivial situations can turn into sizeable books - as demonstrated by Bourdieu himself for the case of buying a real estate property (Bourdieu 2005). Instead the focus of these papers stays on the descriptive Ant narrative but uses Bourdieu's Capital Theory to a certain degree as a form of a self-critique - to point out aspects and elements of the narratives which go beyond the pure account capture-able by Ant. Therefore the Capital Theory lens is applied in a heuristic form, almost in the intention of road signs pointing out different pathways one had missed by following an Ant based map.

6 WHY BRINGING TOGETHER LATOUR AND BOURDIEU CAN WORK

The cases analyzed within this paper rely on the combination of two approaches which might seem contradictory at first sight: Actor-Network-Theory and Economy of the Field.

Both of these approaches have their origins in contemporary French sociology. Although these are on the fringes of philosophy; their real-world applicability has been demonstrated in many case studies before. Actor-Network-Theory has been applied to countless scenarios as well as has it been the case with Bourdieu's concept of capitals, with certain parts of his concepts (e.g. social capital, human capital) having grown far beyond the initial field of sociology, drawing a substantial following in other academic disciplines.

The relationship between the central protagonists behind these approaches, Latour and Bourdieu, can be characterized by a shared aversion for each other's viewpoints. The reasons thereof are multiple and range from methodical critique (Bourdieu's theory for example strongly stands in contrast to the "emptiness" of Latour's actor) to subtle animosities (Latour describing a student-teacher discussion pointing at Bourdieu as a "real scientist") (Latour 2005). The question emerges: Why would one try to bring these contradicting viewpoints together, which obviously do not stand on shared foundations and beliefs?

The answer to these questions can be found in the inherent ideas of both concepts. But it requires distancing ideology from methodology and to put, at least for the sake of the research objectives, the essentially different viewpoints (e.g. on structuralism) aside to concentrate on the core elements. This should allow us to combine the strength of both approaches and therefore unfold an approach both capable of explaining the composition of networks, as well as the consecutive phases, which make them the foundation of market-dominating mechanisms.

While Actor-Network-Theory reflects the fragility and complexity of emerging network structures ("when things emerge really fast" Latour 2005, p.12), Economy of the Field offers an approach to interpret dynamics within a field, not only in an emerging setting but a continued struggle and attempt to balance different forms of capital. For the aim of this research, the understanding of market domination, Bourdieu's capital theory took an important turn in his later works. Whilst his early was mainly centred on the three central capital forms economic, cultural, social plus a transcending capital form (symbolic capital), he enhanced this notion to consider the technical, financial, commercial, juridical, and organizational capital forms (Bourdieu 2005, p.194). Both the volume and structure of these capital forms are seen by him as essential in allowing a company to gain a competitive advantage. In its core these capital forms are described as being based on both objectification (e.g. equipment) as well as embodied (e.g. skills). This is, to a certain degree, an enhancement of Bourdieu statement that this human/non-human relation is at least true for the cultural, technical and commercial capital forms (Bourdieu 2005, p.246).

The assumption that the other five capital forms are indeed also based on objectivised and embodied forms is, at this point, only laid out as a rough sketch and on an exemplary interpretation. In this paper an attempt is undertaken to

view the different capital forms in the most literary way possible, meaning as described by Bourdieu's own words, blending out the countless re-interpretations of capital forms by contemporary literature. The notion of financial capital as a human /non-human construct is becoming visible, especially on the issue of raw material. For example, in the case of gold the price is defined by the core economic functions demand and supply. Here, demand is an essentially human aspect (buyers) and supply a factor limited by nature. Juridical capital is again the result of the negotiation between human and non human actors, as elaborated by Latour's "Making of Law" (Bourdieu 2005, p.194). Furthermore, Organizational Capital as described by Bourdieu includes information about the field, thus information which is quantitative data (e.g. MIS), but also includes qualitative ("tacit") knowledge of each human actor involved in a company. For Social Capital one has to consider the position of Bourdieu, who sees it also reaching at proxy effects, meaning the resources an actor can mobilize as well as the profits it can produce (Bourdieu 2005, p.246). Furthermore, the hybridization of technology as well as the mashing of virtual and real elements could for example see ICT artefacts, such as mobile communication devices, as essential parts of the construction for social capital. The final form of capital is Symbolic Capital which, similar to Financial Capital, relies on the construction of value between human and non-human actors (i.e. the construction between one or more actors of the perceived value of a third actor, which is of course dependent on in how far the third actor is able to deliver within the borders of these expectations). Thus it can be seen as essential that all forms of capital rely and depend on the processes between human and non-human constructs, and built on each other in order to bring these capital forms into existence.

This makes it possible to argue that the constituent elements of capital are in fact human and non-human elements, thus allowing us to bridge a way towards Actor-Network Theory This makes it possible to develop an interpretation of the market which is no longer based on a distinct separation of human/non-human participants (Callon 1999), but an understanding beyond that, of where markets are determined, and how different actors collaborate and consequently create different forms of capital[8].

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[8]

strength and weaknesses in the capital structure, as well as many other internal and external factors. To a certain degree, one could see parallels to the classic competition interpretation by Porter, e.g. the five forces.

7 CASE STUDY: MS-DOS

7.1 Situation of Domination

The late 1970s were a time period which brought about substantial changes to the world of computing. The arrival of the personal computer opened the gates to a world of digital technology which surrounds us today. At the heart and soul of this development stands the emergence of the "operating system", the foundation for the software industry of today. This section aims to investigate how actors and networks emerged, aligned and, ultimately, the translation between competitive narratives, some of which have survived and are disputed to this day. This case therefore first takes a look at the emergence of Dos, followed by the struggle of Dos towards domination and finally the narratives and translation between actors on the issue of domination. The section concludes with a short interpretation of the dynamics by the accounts of Bourdieu's Capital Theory.

7.2 ActionNet: Personal Computer and Operation Systems

The story of MS-Dos and its road to domination can be seen as closely related to the emergence of personal computers. The increasing affordability of microprocessors even for home users ("hobbyists") put new perspectives on the emerging field of computers. In fact, the emergence of Dos is itself closely linked to the decline (or some would say destruction) of another operating system: CP/M9.

At the start of the 70's, the 8-bit processor dominated the computer market. Systems such as the 8bit Atari or Apple II were largely dependent on a very close relationship between hardware and software manufacturers - with both often being produced by the same developer. But the relationship between hardware and software bundling was already in 1969 the subject of conflict in the case United States vs. IBM. Fisher, the chief economic witness in trials both against IBM (for IBM) as well as years later against Microsoft (against MS), argued that bundling was at this time "a response to consumer demand... providing a guarantee that computers would function ad solve users' problems." (Fisher 2005, p.148).

In this closed connected relationship between hardware and software manufacturers CP/M arrived, becoming one of the first operating systems to be based on an open system architecture, thus creating a market for both hardware and software competition. As a result, the software dominated the 8-bit processor market, with over 250.000 copies sold, later going on to become the basis for a variety of 500 3rd party software products (Kildall 1981; Swaine 1997). In retrospective, the irony of Hogan's "History of CP/M" becomes obvious when he wrote: "Recently, there has been talk of the imminent demise of CP/M, due to IBM's adoption of MSDOS as their standard operating system. Give the effort Digital Research has put into making CP/M address all aspects of micro computing of the past, and given the numbers of CP/M users already in

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9 CP/M was first the short form of Control Program/Monitor, later the M was interpreted as a placeholder for "Microcomputers" or "Microprocessors".

existence, such doom-saying is most likely only wishful thinking on the part of competitors. Like it or not, CP/M is here to stay" (Hogan 1983, p.206).[10]

The events following this development led to lots of discussions and arguments, which lasted until very recently. In 2007 Tim Patterson sued Harold Evans over defamation regarding the origins of MS-Dos (McDougall 2007). But what had happened?

The essential controversy surrounding MS-Dos can be seen in three sequences: a) the way MS-Dos came into existence; b) the way MS-Dos came to dominate the PC operating system market c) the way MS-Dos regained its market dominating position. The first is mainly influenced by Gary Kildall, the main developer of CP/M, who died in 1994. Narratives tend to fall into two categories, one painting him as the genius visionary, who foresaw the future of the PC, the other as the genius visionary, who destroyed the domination of CP/M through a lack of business sense. The second can be seen in the context of the relationship between Microsoft- IBM and the last aspect around the anti-trust case(s) against Microsoft.

The origins of CP/M are rooted in the time of the Vietnam War. Kildall was teaching at the Naval Postgraduate School while having close relationships with the development department of Intel. This brought him towards becoming one of the first aware of the 8080 microprocessor. In his free time, he started to develop a compiler (PL/M) as well as a file system (CP/M). Between 1973 and 1975, both projects took more shape and in 1975 the first license of CP/M was sold. In 1976 a hardware manufacturer approached Kildall with proposals to modify CP/M to their system (which was already in the market but lacked an OS). Kildall described this situation as "I was somewhat reluctant to adapt CP/M to yet another controller, and thus the notion of a separated Basic I/O System (BIOS) evolved" (Kildall 1980, p.7). By implementing this feature, Kildall was able to license CP/M to a large variety of OEMs (Original Equipment Manufacturers), thus becoming a dominant player in the emerging industry of operating systems. He ran the company together with his wife (him focusing on the software, her on the business aspects), while leading the development of the OS by developing a Graphical Interface GEM (which was folded after Apple's threat to sue over its similarity to Lisa Mac) (Swaine 1997).

The other account portrays Kildall as an eccentric character, who somehow managed to blow the chance to license CP/M to IBM by either not agreeing to sign a certain agreement, being unwilling to negotiate or by going recreational flying with his plane while the IBM representatives where trying to reach him. IBM had approached Kildall in order to get CP/M both licensed and modified to suit their new product based on Intel's upcoming 8086 platform. The deal ultimately fell through. The accounts of this development are more than obscure and might be best summarized by Jack Sam, a representative of IBM who was involved in the transaction: "Back in those days, there was a lot of misinformation that was deliberate," ... "We spun it, Kildall spun it, and Microsoft spun it" (Hamm & Greene 2004). At the same time, Microsoft had already developed an adaption of Basic for the 8086 processor and gained a reputation

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[10]   The "wishful thinking on the part of competitors" aspect could in fact be seen as a strategy to achieve standardization, since the perceived market situation can be at least as influential to a consumer decision as the actual situation (Schilling 1999).

from its Basic product; leading IBM to approach them to enquire as to how far they were capable of delivering an operating system for the new processor type (Deitel 1990; Carroll 1993).

7.3   Actor-Network: QDos

At the time when Microsoft was approached by IBM in search for an operating system for their new 8086 chip Microsoft was unable to provide an in-house solution for the request and looked for alternative options. They approached Tim Paterson of Seattle Computer, a company already involved in hardware and software development for the 8086 (S-100). Paterson was unsatisfied with the slow development speed of CP/M to suit new hardware, and developed a competing operating system within weeks. Large parts were copied from the CP/M functions, with the inclusion of a new file management system and a close adherence to "Intel's published rules" (Paterson 1983).

It is often implied that Paterson "stole" CP/M, but a closer look at the circumstances paint a more complicated picture. It is argued that, in the 80's, CP/M had a dominating position in the market, similar to that later achieved by Microsoft (Dos). Swaine describes the situation as "Everybody depended on it and resented it for that" (Swaine 1997). Thus it comes as no surprise that Patterson is quoted as saying "I've always hated CP/M and thought I could do it a lot better" (Hunter 1983). Consequently he proposed to his boss that they create their own OS to gain independence from CP/M's domination and gained approval to do so. But Paterson had an advantage, having already developed an advanced prototype of the 8086 CPU Card hardware available at Seattle Computers. Presented with the opportunity to beat CP/M, he ignored Kildall and his colleagues request to provide them with a prototype of the 8086 CPU Card, instead focusing on working with Microsoft and building a competing ("Quick&Dirty Operating System" - QDos) alternative to CP/M. This project ultimately succeeded and the Paterson/Microsoft cooperation was able to finish their operating system one month before Kildall and his colleagues were able to do so. Paterson sold Microsoft the right to issue OEM licenses which led to a highly profitable contract between Microsoft and IBM.

It might be appropriate at this point to draw attention again to the actors, networks and translations. At first, this part of the MS-DOS history is highly relevant to Ant since it characterizes an essential conflict over translation (CP/M to QDos). It is a story about the inventor/invention discussion, about originator and copying. The story usually features the genius Gary Kildall in the role of the underdog, the villain capitalist Bill Gates and the accomplice to Gates, Tim Paterson. This is fuelled by almost classic crime story mysteries, among these an unsolved death (Gary Kildall)[11] and a "secret" scripture central to the story,

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[11]   The circumstances are somewhat blurry and give speculation until today on the exact background (Markoff 1994; Akass 2006). This gives motivation to all kinds of conspiracy theories, such as a recent (2008) YouTube video titled "Murder on inventor MS DOS solved, prime suspect found" (http://www.youtube.com/watch?v=y1dMeM8VpAs).

which is only accessible to a very small number of selected people (Kildall's memoirs)[12]. This leaves lots of room for speculation.

But it is also the case of an established network which falls apart and is largely disassembled by the emergence of a new network. One could be characterized as the 8080 network, the other the 8084 network. Among the actors of the 8080 network were such meta actors as Microcomputer Application Association, Seattle Computers, IBM, Intel the Chip itself and many others. As pointed out by Latour, the element of spokespersons is central to any network (Latour 2004). The failed negotiations between IBM and CP/M could therefore also be interpreted as the story of spokespersons, who a) were unable to come up with a common translation b) had an inability to represent the represented to their fullest interest. The first is a common problem of negotiation, since negotiation might be, at its core, the settlement for a common translation between two parties. Since Ant implies a more or less indefinite number of translations existing at any given time, the "consensus ad idem" seems to become a more and more complex obstacle. As a result, a multitude of narratives exist and, as mentioned in an earlier paragraph of this paper, Paterson was unable to establish himself as the originator of MS-Dos in the court of law in 2007 against the author of a book, who claimed he had copied most of the system from Kildall (McDougall 2007).

The reasons for the disassembly of the 8080 network could be attributed to a range of incidents. Among these are the approval of Paterson's Boss Rod Brock to let him develop an Operating System, the geographical proximity between Seattle Computers and Microsoft, the thrive of Paterson to get rid of the CP/M dependence (Hunter 1983), the lack of business sense of Kildall (he tried selling his company to colleagues for being bored of the business aspects) (Swaine 1997), the lack of an established copyright law for software (Orlowski 2007) or the inability of Kildall's company to be customer oriented (despite having 75 employees) (Swaine 1997) and acting as a typical market leader (""do business on Digital Research's term or not do business at all") (Schnaars 1994, p.132). But how do Microsoft and Bill Gates fit into this picture?

Both Microsoft and Digital Research (Kildall) had a pre-established network long before the MS-Dos conflict. Microsoft developed for the CP/M system the programming software "Basic". Both companies allegedly worked closely together until Digital Research offered their own version of Basic (Schnaars 1994). This could be seen as one of the breaking points, turning one essential actor of the 8080 network to look for allies to form a competing network. The opportunity given by the arrival of a new network determinative factor (8086)[13] offered the ideal constellation for the alignment of a new network. Microsoft found a willing "accomplice" to sabotage the existing network in Paterson's and his disliking for CP/M. To take a contrarian perspective: Paterson could be seen as an excellent spokesperson for the new 8086 system. He not only created a central actor of the new network (QDos) but also made it easy for actors of the preceding 8080 network to join the 8086 network. This was done by creating an

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[12]   The manuscript was only distributed among Kildall's friends, with a total of 50 books printed. It was never released publicly. In 2009 one of the 50 prints was sold at an auction for $1600 (http://www.liveauctioneers.com/item/6176143).

[13]   It might be worth mentioning at that point, that software was not compatible from 8-bit to 16-bit.

environment in which the alignment of new actors was conflict free by staying as close as possible with CP/M and only making modifications within the system and not on the outside, thus letting actors largely keep their translations established in the previous network.[14] Since it was not possible to run software written for the 8080 on the new 8086 system, QDos allowed programmers to "translate" their software to the new system in a semi-automated process. These actors were actively approached by both Seattle Computer as well as Microsoft, apparently with minor success until IBM arrived on in the scene (Paterson 1983).

7.4   The Path to Power: Microsoft, IBM and the World

The story of the emerging 8086 network is characterized by essential conflicts between actors about the alignment of new actors into this emerging network. One of the core developments in this negotiation of actors was the relationship between the meta actors IBM and Microsoft.

The popularity of the 8080 system and the CP/A operating system made IBM aware that there might exist a market for computer far beyond their traditional point of focus on business and mainframe oriented computing. But the rise of personal computers brought about significant problems for IBM: The short term inability to define essential actors required the building of a new meta actor with core actors bought in from outside of the IBM network, in addition to the apparent inflexibility of the IBM network to adapt quickly to new situations. IBM had decided to enter the home user computer market by introducing the personal computer. The company lacked essential resources and was unable to come up with the required components themselves in a short timeframe, and thus bought most of their essential components from third parties (Pinchot & Pinchot 1996). How the relationship between Microsoft and IBM came into place is somewhat unclear. Microsoft must have gained a reputation in the growing computer industry through the consistent delivery of Basic, and thus IBM initially approached Microsoft to produce Basic for the new PC project (Rosenbaum 1998). The true circumstances surrounding the initiation of the alliance between the meta actors Microsoft and IBM might be more complex. Both the chairman of IBM, John Opel, as well as Mary Gates (Bill's Mother) served together on the board of a local charity organization. Allegedly she approached Opel on the subject of IBM cooperating with her son's company, but received no reaction from Opel. Later at an internal IBM meeting, Opel is quoted asking "That wouldn't be Mary Gates' boy Bill, would it?", thus sweeping doubts about the credibility of Microsoft away (Carroll 1993, p.34). The emergence of the Microsoft/IBM alliance could both be traced back to preceding networks, such as the bounds of Gate's family, but certainly also to Microsoft's ability to demonstrate its reliability of translations and actions within preceding networks.

Although Microsoft was able to deliver the new operating system (which was renamed to Dos-86, later PC-Dos / MS-Dos), the issue of Paterson's translation of the CP/M system came back to haunt them. Paterson and his company as well as Kildall and his company were threatening to sue Microsoft and IBM when they became aware of the magnitude of IBM's PC project. Paterson was unsatisfied for not being fairly compensated, Kildall for feeling that his system was more or less just a copy of this own CP/M. With both parties a settlement was reached: Paterson received a higher compensation and IBM offered Kildall to give buyers

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[14]   Even aspects of in how far CP/M did contain components or was, at least in its beginnings, a public domain application are "stuck in translation" (Osborne 1980).

the choice between Dos and - the now 8086 ready - CP/M. Since Dos was already available for many months and was priced significantly lower (Dos - \$40, CP/M - \$240 [15]) CP/M was almost destined to lose the battle of defining the essential OS in the new 8086 market.

7.5   The Name Game: QDos to 86-Dos to PC-Dos to MS-Dos

The history of Dos has seen various name changes for the product. These can be traced back to the alignment of meta actors to the existing Dos network. Patterson described the system as quick and dirty, thus calling it Q(ick) D(irty) Operating System. This could be seen as a phase in which one actor (Dos) was largely influenced by its creating actor (Paterson), thus naming it by the very characteristics Paterson saw inherent to the system.[16] How the first translation of the system's name occurred is described in a number of different accounts. Paterson himself refers to it from an ex-post perspective consistently as "MS-Dos", so his viewpoint might not help to bring more insight to this situation (Paterson 1983). There are numerous interpretations of the reasons behind the name change. One such interpretation is that Paterson and Seattle Computers had realized that Dos is going to stay around longer than initially expected, and thus they decided to remove the "Quick & Dirty" reference (Watson 2008). Another interpretation is that it was due to improvements in the underlying code, and the inability to sell "programmer humour" to a broad audience (King 1988, p.XXVIII).

The following period could be seen as the beginning of the power struggle over Dos and its name. The next naming issue developed around 86-Dos and SCP-Dos, but it is unclear for how long the names lasted, the first called after the new processor (8086), the second as a short form of the company, which employed Paterson "Seattle Computer Products". Depending on the account of the narrative, both were consecutive to each other (Jones et al. 2002) or names for the same product (Somerson 1990). This struggle between two essential actors (8086 and SCP) about the definition of a third actor (the OS) did not stop there, but continued further.

The third phase of the name game can be identified around MS-Dos and PC-Dos. In this case two further actors, MS for Microsoft, and PC for the actors IBM and PC, competed for the naming of the OS. Microsoft had negotiated with IBM a non-exclusive licensing of the system, meaning that they were able to sell Dos to 3rd parties independent of IBM[17]. Both companies therefore sold Dos for some time under their own name. However, in how far these were both the same

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[15]   The price difference is difficult to interpret since contracts were partially oriented on the projected installation of the system by OEM companies. Although people from CP/M involved in the negotiation attribute the pricing problematic to higher royalty by Kildall and his company (Hamm & Greene 2004).

[16]   Paterson later argued on plans for two system approaches, one exclusively oriented on developing an OS for the 8086 in the fastest possible way, the second a "much more refined operating system available in both a single-user and multi-user version" (Paterson 1983). The later one was never realized.

[17]   Brickling described this licensing issue as "an incredible act of charity or stupidity" on the accounts of IBM (Bricklin 1995).

product is again arguable. Some consider these to be the same system, which just had different names for branding reasons (Parsons & Oja 2007). Indicators that this might not have been the case can be found in more contemporary sources. In an interview with Network World, Bob Metcalfe is quoted as saying: "Is Microsoft speaking on behalf of IBM or not? What IBM does is key. We try to be PC-DOS-compatible, not MS-DOS-compatible." (Petrosky 1987, p.17).[18]

The struggle over the definition of the operating system actor continued in another form far beyond the limit of the system name. In 1985, Microsoft and IBM planned OS/2 as the replacement system to MS-Dos. The system was a joint venture between both companies, with IBM as the main driver behind this development, recognizing the new-found importance of the software market. At the same time, Microsoft developed a "Windows" based system, leading to a complicated situation. In the end OS/2 failed[19] on the market, pointing at the half hearted commitment by both meta actors[20]. But the reasons for the failing of the OS/2 network cannot be attributed just to the conflicts between those meta actors involved, but also to the fact that it was unable to align further actors in its network. This meant that despite a supposed technological superiority to Windows, not enough actors (3rd party programmers, applications, users) were willing to join the network at the given time (LaPlante & Brownstein 1989; Corcoran 1995; Berson & Smith 1997).

7.6   Market Domination and the Antitrust Investigations

Microsoft's consecutive domination of the Operating System market led to increasing unpopularity, which was in part based on the many unsettled narratives from the past. This development led to a complaint by the US Department of Justice against Microsoft and the licensing of MS-Dos. Essentially the focus was on the issue of how Microsoft licensed Dos to OEM companies and in what ways this practice led to a monopoly constellation (United States v. Microsoft Corp 1995). Microsoft avoided a potential trial by agreeing on certain restrictions on its licensing practice.

The timeframe under review by the investigation centred on the years 1990 to 1992, with a market share of MS-Dos in IBM-PC of around 70 percent and total OS market in the 50 percent area (Bernstein 1993). The circumstances of this investigation can be characterized by the far reaching dimensions the project took, with over 100 people interviewed, 14,000 attorney hours, and 3650 economist hours, leading to the production of around one million pages of documentation (Bender 1995).

In this chapter therefore the focus is on the constellation between the meta actors Microsoft, Department of Justice and the Federal Trade Commission and

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[18]   Among many other versions, Kildall made an attempt to enter the Dos market in 1988 by introducing DR-Dos, a CP/A compatible version of Dos. By 1990 it was placed third in the most shipped Dos distributions, with MS-Dos at 11,648, PC-Dos at 3,0331 and DR-DOs at 1,737 (Bernstein 1993).

[19]   Windows NT could be seen as one of the actors having been emerged out of the failing OS/2 network.

[20]   With Microsoft faced with the challenge of having to develop for two essentially different systems and IBM in fears that Microsoft might license the system again to 3rd parties in the way it did with MS-Dos (Edstrom 1998).

consequently their translation of the situation. As a fourth meta actor the European Economic Commission joined the network, thus acting as a spokesperson for European interest in the negotiations with Microsoft.

The conflicts were in four core aspects of Microsoft's licensing practice in regards to both original equipment manufacturers as well as 3rd party developers:

"a) long term contracts

b) large minimum commitments

c) the "per-processor" contract

d) overly restrictive nondisclosure agreements"

(Gilbert 1998, p.413)

Essential to the question of domination are a range of questions, among which are: How did the licensing problems come into existence? Why would actors enter contracts which were obviously leading towards a constellation of market domination?[21]

a) Long Term Contracts

The issue of long term contracts could be interpreted from a perspective in which individual OEM companies realize that they have no substantial influence on the market, thus align themselves with the status quo (Ramseyer et al. 1991). The benefits of a long term contract (higher stability of the actor, expectable outcomes, possibility to plan for a longer time frame) outweighed apparent benefits of short term contracts to the OEM.

b) Minimum Commitments

The combination of long term contracts and large minimum commitments were part of a sophisticated contract structure by Microsoft. The commitments were based on estimations of over 50% of the expected OEM's sales. By demanding substantially higher upfront contract commitments and consecutively the crediting of unrealized capacities to follow up contracts, Microsoft was able to place OEMs in a situation in which non-renewing of the contract was connected with the requirement of substantial monetary compensation.

c) Per Processor Contracts

Microsoft offered OEMs three forms of contracts I) per processor, II) per copy, and III) per-system. While the first was calculated on the manufactured number of processors, the latter two were paid on a per sale basis. Over time, Microsoft managed to convince many of their larger scale customers to agree on per processor oriented contracts. The reasoning of this situation can be explained twofold; one to create an environment where the OEM has no interest in offering alternative operating systems, as well as a protection for Microsoft from piracy since products are already licensed by the processor purchase.

d) Overtly Restrictive Nondisclosure Agreements

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[21] The following three paragraphs (a-d) are essentially based on the accounts given by Gilbert (1998) and Lapatka & Page (1995).

Microsoft offered 3rd parties access to information about its upcoming product (OS) specifications. This was intended to make it easier for developers preparing their applications for upcoming changes in the system. But at the same time, actors willing to enter this relationship had to sign nondisclosure agreements which prevented them from adapting their software to other operating systems for up to over a year.

But the allegations were far more complicated than just these four central issues. For example, the book Hard Dive (Wallace 1992) played a central role in the discussion. Allegations made in the book were brought forward by the Justice and demanded from Microsoft an explanation of their position on this. Among the accusations, the practice of "vapourware" stood out as the aggressive promotion of software before it's availability in order to drive consumer attention away from the launch of a competing product (USA v. Microsoft).[22] In the end Microsoft settled with the US Department of Justice and the European Economic Commission by agreeing to change their operating system licensing practice.

Taking a closer look at these allegations and constellations from an Actor-Network perspective, the elements contributed to dominating actions on the sides of Microsoft could be characterized in aiming to control a) existing actors b) the creation of future actors and c) the prevention of actors to enrol in 3rd networks. The control of existing actors could be interpreted in a variety of ways. First, Microsoft offered a stabilized network to those looking for an OS, thus allowing OEMs to focus on the alignment/creation of other actors in areas they found themselves most competent in. Furthermore, by being cooperative with 3rd parties Microsoft ensured that a constant grow of the network was guaranteed, as well as a translation process in which strong abilities to determine the narrative were available to Microsoft. At the same time, the per-processor licensing ensured that a continuous placement of the actors, combined with the long time contracts, permitted growth of the network and a reduction in the willingness of actors to join a different network. This practice illustrates the concept of "vapourware", which could be interpreted in this context as the creation of a network around a non-existent meta actor, with the main intention of attracting actors to it in order to prevent them from joining a 3rd network.

7.7   Bringing in Bourdieu's Capital Theory

In the previous section, Actor-Network-Theory was used to examine the translation processes between the different actors. I now turn to Bourdieu's Theory on order to give short elaborations on essential viewpoints which go beyond the initial Ant focus. This outlines different directions the analysis of the inherent complexity can take, and to point at elements outside of the pure

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[22]   An example of the challenges in translating the phrase "vaporware" are illustrated with this note, taken from the original court document: "Based on his reading of Hard Drive, the district judge initially described "vaporware" as "putting out announcements that are misleading or not true to freeze the competition." When the judge asked Microsoft whether it engaged in "vaporware" so defined, Microsoft stated that such charges are "entirely false." Microsoft did not deny that it preannounced products, but explained in its subsequent filings that such preannouncements do not violate the antitrust laws unless they are knowingly false or misleading when made. The judge rejected Microsoft's position, stating that Microsoft's lawyer "[n]ever told me that you have this funny little interpretation of vaporware." (USA v. Microsoft 1995)

network translations which have substantial impact on the pathway towards domination.

Financial Capital: This aspect touches many actors in the emergence of MS-Dos. From the sophisticated licensing fee structures, to the financial capacity of IBM to support the PC launch, the network accumulated substantial financial assets which were leveraged to grow the network further. This not only strengthened the MS-Dos Network, but also artificially supported the creation of further networks (i.e. market products at a loss to gain market shares).

Cultural Capital: The rise of MS-Dos could also be seen in the spotlight of cultural capital and the US-centric business values, probably best represented in how an established actor like IBM was willing to cooperate with such a young and small company as Microsoft on such an essential project. Another cultural element here could be seen in the element of local proximity, i.e. that almost all of the involved companies were active on the west coast of the United States.

Technological Capital: The story is also a demonstration of how technological capital can fail in isolation, and require some other form of capital. The struggle of Kildall, who surpassed most other actors in technological capital, but struggled in other areas, e.g. running the company, demonstrates how networks with an apparently more balanced capital distribution might be more able to align new actors.

Juridical Capital: Juridical elements are a constant factor through the story, both in the weakness of copyright in the beginning, as well as the settlements with Paterson and Kildall. However, the sophisticated contract constructions of Microsoft imply a certain strength in the Juridical Capital of the Microsoft / IBM network. As a consequence, the ability of the meta actors in Microsoft to avoid the separation of the company could be seen as an indicator of how juridical capital influences the stability and life circle of the network.

Organizational Capital: From an organizational standpoint, the decision of IBM to outsource almost every component of the new system could be identified. This allowed an alignment of actors independent from existing networks, thus making it possible for MS-Dos to establish such an essential role in the PC industry as well as allowing IBM to enter the market more rapidly.

Commercial Capital: The past experience and knowledge accumulated by the Microsoft Network in the distribution and sale of Basic could be seen as the main initiators here. It allowed for different licensing models and distribution alternatives to be tested, thus essentially building the groundwork for when MS-Dos was brought to the market.

Social Capital: The initial aspect of social capital is among others in the limited group of people at that time involved in the emerging personal computer. But on an actor to actor level these become more obvious. The close relationship between Kildall and Intel helped Kildall to gain a lead in the development of an OS for the 8080 chipset. Similar capital functions can be seen later, in the Gates-IBM, Microsoft-Paterson relations.

Symbolic Capital: Another topic which can be traced through the twists and turns of the whole story is symbolic capital. From a negative perspective, Paterson's "hate" of CP/M could be seen as an essential impulse to the creation of Dos. Similarly, this negative form could be identified in the path leading to the antitrust actions against Microsoft. From a more positive viewpoint, IBM was

able to leverage its brand power ("Nobody got ever fired for buying IBM") into the new area of personal computers, whilst Microsoft established itself as a reliable business partner with an enormous marketing machine.

In this context, every form of capital seems quite powerful by itself; but again only the combination of these enabled MS-Dos to unveil a network of actors which surpassed its competing networks through the allocation and combination of its different capital forms.

7.8   Closing Remarks

The story of the path to MS-Dos domination narrated here has various objectives. The first was to shy away from both the traditional narration of either Bill Gates as the "hero" of operating systems (Gates 1995), or the devil of the personal computer development (Edstrom 1998); it also aimed to avoid narrating the story of Kildall as the "lost" hero (as for example done by Evans 2004). Instead, the narrative focused on providing insights on essential developments which led to the emergence of MS-Dos and its role in the personal computer environment. In order to achieve this, the paper focused first on the negotiations and conflicts leading to the emergence of MS-Dos, following the presentation of different translations and challenges on the integration of an operating system with the emerging 8086 network(s), as well as the conflicts surrounding translations and sense making in an judicial environment.

8 CASE STUDY: ITUNES

The official story of iTunes began in January 2001. At the annual Macworld conference, the co-founder and CEO of Apple Computers, Steve Jobs, presented the iTunes as "the easiest to use 'jukebox' software". The presentation featured, among other topics, the idea of a "digital hub", an essential part of the iTunes concept which will be discussed in more depth in the rest of this section. It is reported that iTunes was downloaded 275,000 times within the first week of being made available (Biersdorfer 2006), not an overwhelming success for essentially free software.

8.1 Situation of Domination

Since its conception, iTunes has developed into one of the most influential factors of media consumptions today. This development can be demonstrated by the tremendous success attributed to the iTunes Music store. Within five years of its launch, the story became the biggest Music Retailer in the United States, surpassing Store Chains such as Wal-Mart or Best Buy. Today the store has sold over 10 billion songs and 200 million TV episodes worldwide, in addition to over 7 billion applications downloads through their integration with mobile devices.

8.2 Narrative Challenges and Struggling with the Meta Narrative

The story of iTunes closely associated with the success of Steve Jobs himself. This relationship demonstrates one of the problems of doing research in this area, namely the consistent secrecy of Apple combined with a central focus on Steve Jobs as the human face of the company. This situation has been described numerous times in conventional journalism, including by Shafer who noted: "Apple manipulates several narratives to continue to make its products interesting fodder for journalists" (Shafer 2005). Moreover, the sources surrounding the story of the iTunes success are mainly attributed to either Apple and Jobs, or former partners, which are no longer in business contracts with Apple. This brings an apparent bias and filter to the story since essential actors, such as the pre-iTunes software, voiced no public statements. Carrying out research into such an environment, especially in a research perspective which prides itself on looking beyond the sheer meta narrative, brings with it a number of obvious problems.

8.3 ActionNet: Software Development

The late 90s were a time period which brought about substantial changes to the world of music. These changes were based on the development of the MPEG-2 Audio Layer 3 format; a media file compression standard allowing the size of audio files to be reduced substantially, which introduced a variety of dynamics to make use of this advancement. Most notoriously, the emergence of Napster in 1999 pathed the road to a decade of file sharing and, consequently, a decade of controversy surrounding this practice. However, this development also allowed the average user to become much more aware of the functionality of media usage.

The 1990s also resulted in the emergence of a variety of software based audio players, which were able to play Mp3 files. Among these were WinAmp, one of the first (1997) consumer oriented MP3 players which quickly gained in popularity, having 25million registrants by June 2000 (Miller 2001). The Windows based software did find a large following by being free, small in size, with the ability to change its look and feel according to individual designs (skins). The software also prided itself on having a very down-to-earth approach (for example the installation screen featured a message "Play with it as much as you like, but don't blame us if it melts your computer into a pile of scrap metal or steals your girlfriend). But WinAmp lacked two essential abilities: It was neither possible to run it on a Mac[23] nor was it able to manage larger libraries of files.

Similar software emerged for the Apple Macintosh at the same time as WinAmp. Besides Apple's own Quick Time Player, 3rd party applications emerged, including MacAmp, Audion and SoundJam MP. While in the end Apple paired up with (bought...) SoundJam MP to develop iTunes, one of the founders of Audion (Cable Sasser) shares his point of view in a very rich narrative on his website. While it describes the struggles of developing the future of their company (they were at this time in negotiations with AOL, who had acquired WinAmp before), it also tells a highly interesting account of the interaction between him and Steve Jobs. He describes himself cold mailing Jobs about his software and uncovers parts of the motivational aspects behind it: "...writing software for a platform you pretty much completely worship — well, it's pretty hard to resist e-mailing God if you know He checks his e-mail". He later admits: "I received no response, but I didn't expect one. I liked to imagine he'd read it and downloaded and tried Audion, sharing it with his co-workers and family and barber, but I figured it was more likely my message just printed directly into his office trashcan"(Sasser 2007).

At this point it might be interesting to try interpreting this encounter from an Actor-Network-Theory perspective. The meta actors in this encounter can be described as Apple, represented by its spokesperson Steve Jobs, as well as Audion and its spokesperson Cable Sasser. Besides these obvious participants, there are at least three further actors: AOL, SoundJam MP, Greene & Casady and Jeff Robin. While the account narrated by Sasser describes how the translation process from 3rd party software to iTunes started, there is a competing narrative, which might explain the choice for SoundJam MP over Audion from a different perspective. According to an article, published in the Wallstreet Journal (dePlume 2003) years after the decision was made public, Greene & Casady (the company publishing the SoundJam MP application) acted only as a distributor, whilst the software was programmed by Jeff Robbin. Robbin on the other hand was already an employee of Apple in the role of an operating system engineer. SoundJam MP started therefore as a hobby project, which was distributed through Greene & Cassidy, and was purchased by Apple, but in the end Robin did at no time change his employer. The circumstances surrounding this development are still quite misty. For example Casser describes how overwhelmed he was by receiving an email by Jobs himself, asking "Any interest in throwing in with us at Apple?" on December 24th 2000 (Sasser 2007).Now, why would he ask Audion to join Apple when he was going to present iTunes on January, the 9th 2001, only 16 days later? The true circumstances are difficult to uncover, primarily because there is no account of Robin commenting on the

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[23]   Of cause the operating system issue can theoretically get overcome by the use of tools such as "Crossover".

story, and also due to Apple's attempts at secrecy, even trying to prevent the media from disclosing Jeff Robbin's full name (Grossman 2005).

8.4   Actor-Network: Applefication

By integrating the development of the SoundJam MP in to the Apple Corporation, the will to do something became stabilized. Thus, this can be seen as a turning point from just thinking about something ("How cool would it be to have on every Mac a great music player") to actually doing something ("Let's take an existing network - the one forming SoundJam MP - and integrate it within our existing network of Apple Computers). By choosing Robbin as the developer, a form of compatibility between both networks could have been established. The choice might have been essentially influenced by the existence of an established actor who had experience in translating between both networks, and therefore made the Apple Network open up to the integration of SoundJam MP instead of the Audion network as a meta actor. A story by CNN seems to confirm this assumption, pointing out that the choice was made "primarily because Robbin had impressed people while at Apple before" (Schlender 2005). As a consequence, the decision for SoundJam MP was essentially made by the translations initiated by Robbin. Amongst those, some were within the SoundJam MP network, for example the design of the application in a very minimalistic, Apple oriented way; integrating Casady & Greene in the network, who had already gained a reputation for Apple related software, as well as in the Apple Network of knowing essential actors and translation processes; having been a loyal actor to the spokesperson(s) in the past.

Based on this "let's do it" moment, SoundJam MP was integrated with Apple over a period of 10 months.[24] The integration process is described as having been focused on turning the software in to a fully functional audio management system, as well as improving usability. Jobs described this as "Apple has done what Apple does best — make complex applications easy, and make them even more powerful in the process" (Awbrey & Scott 2001). Little is known about the actual process and dynamics taking place, as they almost exclusively took place within the company. But ultimately it could be seen as a result of those that iTunes reached the level of usability that it is often credited with. This allowed an easy integration of the application within the user networks surrounding media consumption, thus building a core element of the "hub strategy".

In his presentation on the future of Apple, Jobs described a vision of hubs and spokes. Summarized, it is the intention of dissembling an meta actor ("Media Consumption") into separate entities (hard & software "spokes") which are in some way connected to a central element (Mac "hub"). But while the idea of spokes succeeded (iPhone, iPod, iTunes) the aspect of a centralized element of the network changed considerably. While iTunes was initially Mac bound, it was soon released for Windows OS, allowing consumers to choose their "own" hub. Further products, such as the iPhone or iPad, became independent entities able to operate completely hub-free.

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[24]   In fact both applications existed side by side for around seven months (Jan-June 2001) before SoundJam MP was discontinued. Audion was also ceased six years later in 2007.

8.5 Creation of Essential Meta Actors: The iPod and iTunes Store

The introduction of iTunes was followed by two important developments; a) the introduction of the iPod and; b) the iTunes store. Both enhanced the network by being able to cover a much broader range of media consumption than iTunes itself. Johnson sees, at the core of this strategy, the idea of making downloading easy and convenient. This is based on the tiangularity between hardware, software and service, which allowed for a strategy of combining high volume low margin music sales and low volume high margin devices (iPod). They describe this approach as being based on value definition and convenience creation (Christensen et al. 2008). But was this really the case, or is it just an ex-post implying that a certain model or strategy existed in the minds of the human actors?

At the first sight, it is certainly true that the development process was essentially driven by the objective to deliver convenience to the area of media consumption. Aspects of this can be found in the first iTunes presentation and the "hub strategy". But taking a closer look at these developments they appear to be much more accidental, especially when taking into account the attempts of Apple to create a compelling narrative.

The conception of the iPod was driven by a combination of events. After an alleged development time of eight month the device was presented in November 2001, eleven month after the release of iTunes. The firsthand accounts of people involved centre around Jon Rubinstein, who was one of the developers involved with the iPod project, and later became head of Apple's iPod division. In one of the rare interviews given by Rubinstein on the iPod development, he describes how Apple struggled in the late 90s against a declining market share in the personal computer sector. The intention was therefore to expand into the emerging market of gadgets and external, independent devices. As a consequence Apple aimed to create additional revenue through devices as well as increasing the market share in personal computers again by positive effects based of these products. Entering the market of photo or video cameras was rejected based on the apparently already high level of development (usability, design) of devices in this market. The area of PDAs/organizers was rejected because of concerns raised by Jobs himself, thus the music player option was chosen (Aaron 2005).

The composition of the iPod network can be traced through the enrolment of actors, such as Toshiba's development of a substantially slimmer Hard Disk (storage/size); the enhancement of battery life through a reduction of hard drive use, by buffering files in the flash memory (energy); the integration of 3rd party products, such as buying the iPod operating software from Pixo, a company also ran by the former Apple employee Paul Mercer (Yi 2004); pre-existing networks around supply chain management and ready-made components (Battery (Sony); Codec (Wolfson), Dac (Wolfson), Firewire (Texas Instruments, Power Management (Linear Technology)). Thus the strengths often attributed to Apple in the usability, (audio) quality and design area are substantially dependent on the integration and alignment of existing meta actors (Aaron 2005).

A competing narrative to this is given by Ben Knauss, a former employee of PortalPlayer. PortalPlayer was a Design Chain Partner of Apple for the development of the iPod. By his accounts, Tony Fadell had developed the idea of combining a portable device with a Music Service similar to Napster. After

approaching multiple companies with the idea and prototypes developed by PortalPlayer, Apple agreed to realize the idea in conjunction with Fadell (who became head of the iPod development team) and PortalPlayer. The essential contributions by Apple were the development of a compelling outer design for the player as well as optimization of usability (Sherman 2002; Kahney 2004). From an Actor-Network perspective this would hint at a high potential of the Apple network to cooperate with existing networks, and a good ability to mediate between existing and emerging networks. This illustrates the importance of sustaining matured networks beyond the initial action they were created for. It should also be mentioned, that all three human actors who shared (directly or indirectly) their account of the story (Ruinstein, Knauss, Fadell) have left the company. This gives space for speculation about their intentions, specifically whether they either had to leave the company because of their public statements (company policy seems to condemn public statements by employees (Markoff 2004) or shared their accounts of the story with self-promotional intentions.

The ability to buy music directly through the iTunes interface was added in the 4th version of iTunes, which was released in April 2003. By having negotiated licensing deals with the major music labels, iTunes started out by offering 200,000 songs as legal downloads. The introduction of the iTunes store can be attributed to changes in the landscape of music distribution, specifically in aspects of pricing, usability, catalogue and contextual features (Fisher et al. 2004). First, the iTunes store offered a consistent pricing of individual songs and albums (99c-$9,90)[25]. This stood in contrast to the subscription based ("flatrate") approaches, set by the "illegal" music download philosophy (e.g. the music subscription based service "Rapsody"). Second, by having contracts with the biggest labels, Apple was able to offer a compelling portfolio of artists. Over time, the store gradually opened up toward smaller labels and providers of other digital media files (e.g. Audiobooks). Third, the store was optimized towards an on-click buying process, allowing Users to buy songs without leaving the interface or requiring any further actions besides a click on the "buy" button. Fourth, the catalog feature began increasingly bridging an existing music library with suggestions for available music fitting to the user's individual interest, thus allowing Apple to market music in a similar approach to that taken by Google AdWords. As a fifth element, the store stayed constantly evolving and relevant, being opened up to visual content in v6, attempts to replace traditional Album booklets with interactive art (v9), and the implementation of Pling, a music oriented social network (v10) (W. W. Fisher et al. 2004).

The relevancy could be here seen from very different viewpoints. For once, it is an impressive story on the domestication of "illegal" markets, showing that a "once free, always free" mantra may be inaccurate. However, looking more closely at the duality of the iTunes store, the essential influences on music consumption can be seen. It is an actor mediating between two Networks, that of the home user and that of a large music library. By way of its features (genius function) it became an effective actor to translate between these two networks, becoming a beneficiary actor to not only the user and his quest for discovering music, but also for the artist connecting with new listeners and Apple which established itself as a provider of additional value beyond just music and technology.

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[25]   The pricing structure became over time more diversified (E. Smith & Kane 2009).

8.6   Bringing in Bourdieu's Capital Theory

As per Bourdieu's account, the volume and structure of capital of an agent are essential to its success. At this point the network of the relevant actors has been described, and it seems to be appropriate to take a closer look at how these contributed to the different capital forms associated with iTunes and its market domination. The capital forms suggested for the case of market domination can be separated in to the following dimensions:

Financial Capital: The influence of financial capital can be seen in many facets of the emergence of iTunes. Most significantly, it can be identified in the pricing strategy, meaning the decision of buying a commercial application, improving it significantly and in the end distributing an application superior to most of its competitors, free of charge.

Cultural Capital: The cultural capital factor could be most strongly identified in the environment already established at Apple. It had already gained years of experience in both software and hardware development, as well as, by the strong Disney/Pixar Movie Studio affiliation, content and service. Therefore, an environment familiar with bridging the hardware-technology-content already existed, and thus they aware of the challenges incorporated in these fields.

Technological Capital: As Bourdieu elaborates, the competitive strategy is determined by the realization of its limitations. Apple did exactly this, by buying external technology, prototypes and content, thus realizing its lack of abilities in these areas and compensating for it by getting the assistance of specialists in this very subject.

Juridical Capital: Perhaps the most apparent juridical advantage is the negotiation with content providers. By implementing a Digital Rights management system (which was later abolished), it was able to transform sectors of a formerly illegal market into a legal construct. On the other hand, Apple was able to withstand legal threats of making iTunes open to 3rd party players.

Organizational Capital: The organizational structure allowed Apple to make decisions with a seemingly high level of independence from any pre-existing restraints, thus allowing them to decide the area of application to go after, as well as a very rapid time-to-market approach. These implicated very effective decision making strategies which were free from ideological restrains (e.g. a complete focus on strength and aggressive buying of any relevant external know-how).

Commercial Capital: The aspect of sales power and marketing could account for an entirely new chapter on the subject o iTunes. Parts of this were the essential Rip-Mix-Burn campaign for the introduction of iTunes, and the iPod advertising campaign. iTunes itself became a component of Apple's overall Organizational Capital, by becoming a part of the iPhone content distribution system for the sale of applications, as well as a component of software deliverance to the Mac OS.

Social Capital: This capital form covers a wide variety of aspects; among the most relevant ones are the environment which was established by Apple itself, which fostered a positive relationship between its (former) employees who contributed significantly to the development of iTunes through non work related activities. Further factors could be seen in the location of the company, the past history of leadership in the area of technology and design, as well as its

spokesperson's personal history (exemplary therefore are the recollection of his thoughts and feelings when contacting Jobs ibid).

Symbolic Capital: One of the most essential factors here is the "mastery of symbolic resources" (Bourdieu 2005, p.195). A wide variety of aspects could be mentioned here, among those certainly the pre-existing (fan) community of Apple users, who were passionate about the product and company. A factor related to this could be Jobs himself, with his public presence and leadership abilities.

8.7   Closing Remarks

The story of iTunes is a story between two extremes: On the one hand, the story of accidents, on the other, the hero mythos of Steve Jobs. The truth, like so often, remains somewhat hidden in between the lines. Thus this segment aims to take a broader look at the issue of iTunes and its contextual embedding.

One of the main results of the iTunes case is the understanding that products should not be seen as independent actors, but embedded within a larger network. With the introduction of iTunes, Apple did not just create a music player, but placed it within an (ever increasing) media consumption system. The actors as well as their actions are increasingly defined by Apple (iPod, iPhone, iTunes). While this has certain advantages in regards of usability and connectivity, it can on the other hand be criticized for locking out competitors' interaction with parts of the system, as well as the problems which emerge around the issue of content control. The discussion of these aspects can be very controversial, but in the end as Czarniawska summarized "I am grateful to Apple that my MacBook is so smooth and easy to use, but the fact is that earlier I knew much more about what was happening, and felt that I had greater influence over my computer" (Czarniawska 2008, p.63). This discussion could signify an interesting sphere of usability between individual choice "in the wild (e.g. the internet)" and mediated environments by gatekeepers (i.e. iTunes store).

It seems necessary to at least to mention Steve Jobs and his leadership in the closing remarks. This comes from a perspective in which leadership theory has undergone substantial changes in recent years. While Mintzberg sees the future in rebuilding companies as communities (Mintzberg 2009), the strength of a community can be seen both internally (employee-company relationships) as well as in the highly effective external user community. In itself, Apple could be seen as a model which has Jobs as a highly centralized spokesperson, and is thus able to dominate the narrative of the company to a large degree. As Latour mentioned, the significance of choosing good spokespersons for a meta actor could certainly be seen as being fulfilled in the case of the Apple Network (Latour 2004). On the other hand, this does of course give the network an increasing dependency on a single actor, a situation which might become very problematic in the long run. Still, the spokesperson role seems to be limited, since demands of the community are reflected by the company and a balance between leadership and community is reached. The relationship between Jobs and the Apple community, the levels of secrecy, surprise, rumour and design might be an ideal subject for elaborating on leadership beyond the traditional understanding.

A review of the iTunes case could not be complete without taking a look at the aspect of an implied Actor-Network history, as pointed out in the introduction. It becomes apparent that, no matter which narrative is followed, the actions of the actors are, at least from an ex-post perspective, based largely on pre-existing

experience with other actors. Thus it could be argued that the pre-established networks between actors strongly determine the potential further network building. This can be seen in the example of Apple, on the pre-existing relationships between core actors (e.g. Toshiba, Rubinstein, and Apple Products) which were essential in establishing new Actor-Networks around the creation and success of iTunes.

9 CASE STUDY: FACEBOOK

9.1 Situation of Domination

In the autumn of 2010 the story of Facebook finally hit mainstream. The movie "The social network" portrayed the founding and first years of Facebook. It consisted of a narrative which focussed on Mark Zuckerberg's role in its founding, combined with a classic Hollywood story line between a tragic hero, girls and money. As the movie critic for the New York Time mentioned "Despite its insistently unsexy moving parts (software, algorithms), the movie is paced like a thriller, if one in which ideas, words and bank books blow up rather than cars." (Dargis 2010).

But how did the story with the "unsexy moving parts" become not only one of the very few stories from the world of technology which led to a "Hollywood adaption", but also a success at the box office (Bom 2010)? One of the reasons can certainly be seen in Facebook's success on a global scale, featuring 500 million users with a 50% daily activity rate. When Zuckerberg was asked about the movie, he replied "Honestly, I wish that when people tried to do journalism or write stuff about Facebook at least try to get it right" (Cieply & Helft 2010).

This papers aims at "trying to get it right", although "getting it right" might depend heavily on the viewpoint of the reader, leaving the author with the "trying" part instead. The aim is in looking beyond the movie with the aim of tracing the emergence of Facebook and its path to becoming the dominant Social Network Site in most parts of the world. Therefore the analysis follows certain phases, among these the emergence of the network, the alignment of new actors and the path to domination of the network.

9.2 ActionNet: Facemash and Other Fragments of Preceding Networks

The story of Facebook is, in the conventional narrative, closely associated with Zuckerberg as the central protagonist. Although there is an unquestionable risk of falling for a dominant meta narrative, it seems relevant to lay out the actors forming the pre-Facebook network, and then follow the actors towards the stage when the Facebook network was initiated.

Before Facebook, Zuckerberg was heavily involved in other ventures and projects in the games and entertainment field. Among these was a version of the board game "Risk", a screensaver for displaying AOL Instant Messages and Mp3 player synchronisation as well as the plug-in "Synapse" for the WinAmp media player. The later project can be viewed as a predecessor of iTunes's "intelligent" playlists which aimed to achieve an understanding of listeners' past audio behaviour to suggest suitable songs for the "future" (D'Angelo & Zuckerberg 2003). The software started as a high school project but became a respectable success, with offers to buy the software for in excess of one million dollars, as well as job offers for both of its authors (Brickman 2003). Ultimately the deal fell through due to the reluctance to sell on the side of Zuckerberg, leaving both to start their college lives at different Universities.

Around this time (2002-2003), Social Network Sites became increasingly significant as an internet activity, with Friendster being founded in 2002;

MySpace, LinkedIn and Last.FM in 2003. This period could be described as a time of profile nomads, with users flocking from one network to another for various reasons. Boyd and Ellison describe the situation as largely based on the inability to cooperate with the demands of certain user groups (e.g. groups, bands or non-singular-person structures) (boyd & Ellison 2008).

9.3   Actor-Network: Clustering of Actors towards TheFacebook

The initial start of Facebook is often attributed to being around the time of the "Facemash"[26] project in October 2003. The project featured an altered version of the classic Hot or Not voting mechanism. The Facemash version compared the pictures of two Harvard undergraduate students and let users vote on which one of both they found more attractive. However, the Facemash idea was not uncontroversial at the time. Firstly, Zuckerberg had gained illegal access to the data of students from other dorm houses in order to collect the relevant pictures and names; secondly it faced a backslash for being discriminatory. As a result, he had to discuss the issue with the school's administration board, but ultimately no actions were filed against him (Kaplan 2003). Taken into perspective, this incident can be seen as fairly common at that time. An almost identical incident, where a student created a hot or not based voting system using photos of other students, is reported in the MIT student newspaper a year before the Facemash creation (Lang 2002).

TheFaceBook was released in February 2004 as a community largely centred on students at Harvard University. Zuckerberg described the issue as "The facebook isn't even a very novel idea. It's taken from all these others. It's basically the same thing on a different level. And ours was that we're gong [sic] to do it on the level of schools"(McGinn 2004). The motivation for founding the website is attributed to a number of different factors: One is that Harvard itself promised to deliver a virtual student register, which was seen as moving forward too slowly; another that Zuckerberg's High School had already developed virtual register (Antonas 2009); and finally that they aimed to make Harvard a more friendly place.

The first enrolment of actors took place by using existing mailing lists of the colleges. This allowed them to approach those members who fulfilled the pre-existing condition, that any actor joining had to be an actor in the existing Harvard University network (Mossberg & Swisher 2010). This could be seen as an initial starting point to motivate members to create virtual identities which match their physical identities, in contrast to other preceding social networks (e.g. Goffman's impression management (1959); as performed on MySpace (Booth 2008).

The increasing number of actors enrolling with "TheFacebook" demonstrates that the relationship between Zuckerberg and TheFacebook was not strong enough to supply the increasing alignment of a single dependency, as well as a rising awareness of new actors (outside of Harvard) willing to enrol in the network. This could be seen as an example of how translation can become a process far beyond the initial concept of its initiator.

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[26]   The original domain "FaceMatch.com" was sold at an auction in October 2010 for slightly above $30.000. (http://flippa.com/auctions/108465/Facebook-Founders-FIRST-known-website-FaceMash-com---As-featured-in-the-Movie)

In an attempt to cope with the unexpected growth of the Network, Zuckerberg chose not to let actors themselves take over the future of the network, but enrolled four of his University acquaintants to support the growth of the meta actor (Kirkpatrick 2010). Within months, TheFacebook expanded its services to other Ivy League colleges.

9.4   Rival Networks: TheFacebook, ConnectU and CU Community

The emergence of TheFacebook is closely related to the argument of who stole what idea from whom. Taking into account that neither one of the sites pioneered the Social Network Site concept, it is hard to take sides (e.g. SixDegrees.com, LiveJournal, LunarStorm all predate Facebook by far (boyd & Ellison 2008)). The controversy is therefore between ConnectU, CU Community and TheFacebook.

ConnectU was a business venture, originally called HarvardConnection, started by other students of Harvard University. Zuckerberg joined their project with the intention of finishing the site. Soon after joining the project TheFacebook emerged. The story surrounding the events are somewhat disputed, with Zuckerberg delaying the finishing of the site. What followed was a dispute over the translation on two levels. Firstly, his co-students were able to enrol the Harvard Crimson Student paper to put the issues forward. In revenge, Zuckerberg tried hacking the newspaper member's email accounts and was able to successfully do this in two cases (Carlson 2010). What followed was a long lasting lawsuit between both networks on a number of issues, including breach of a verbal contract as well as theft of source code. In the end a settlement was reached, with Facebook buying ConnectU and substantial compensations for the actors involved.

The story of CUCommunity is substantially different to ConnectU, but nevertheless highly relevant to the emergence of Facebook. Both Social Network Sites had similar roots; both were started at around the same time, they were both found by students, both students attended Ivy League universities and both networks could be seen as considerably successful in aligning new actors in their beginnings. Thus, an ideal starting point is to look at this situation in the hope of finding some pointers on Tarde's question "Why is it, that out of a hundred different innovations simultaneously conceived - whether verbal forms, mythological ideas, or industrial processes - some ten should spread over society and ninety be forgotten?" (de Tarde 1962, p.152).

This question is even more interesting to look at, since there is access to the sense making of one of the actors involved. The CUCommunity was started by the Columbia University undergraduate Adam Goldberg and became public to all Columbia University students in early 2004. It reached extreme popularity among members of the school within a very short period of time. But when Facebook began opening its service for students at Columbia a rivalry began, climaxing with members of both networks "Googlebombing" each other's Social Network Sites (Neyfakh 2004; Swindler 2004). But while the aversion between both networks grew, Zuckerberg and Goldberg met to discuss the possibility of Facebook buying CUCommunity; this was later followed by an invitation to Goldberg to work for Facebook. However, no agreement was reached, and instead CUCommunity was renamed Campus Community and competed with Facebook for the enrolment of new actors. The competition for the enrolment of

new actors became increasingly intense, as Facebook did not just follow a strategy of approaching new actors individually but approached schools based on pre-existing ties between them, mostly on a geographical basis (Kirkpatrick 2010). This led Goldberg to enrol new actors to develop his network further, but could not ultimately prevent Campus Network from falling more and more behind the rapid growth of Facebook.

Of course, the question at this point ought to be asked: What made the difference; why does one of them feature in the biggest entrepreneurial success stories of the last ten years, while the other faded in to almost complete obscurity? Attempting to answer this question is a dangerous endeavour, and an almost unavoidable act of hybris. Even if the assumptions and indications were partially true, it still offers an ex-post narrative, thus a construction of the past which is built on a minefield of pre-assumptions.

Tarde interprets this element of success as being two fold, both physical as well as social. Since he declines the opportunity to provide an explanation of physical causality, the focus is on the social aspect. As the elements determinative factors of success ("extra-logical") he identifies logical and extra-logical factors. The logical is the aspect of how something now is positioned within the context of the existent. The second dimension, the extra-logical factors, contain three elements: "(1) the subjective model will be imitated before the objective, and (2) the example of persons or classes as well as localities that are thought superior will prevail over the example of inferior persons or classes or localities. ... A like presumption of superiority attaches (3) at times to the present, at times to the past, and is a potent factor and one of considerable historic significance in favour either of the examples of our fathers, or of those of our contemporaries" (de Tarde 1962, p.194).[27]

Now, considering the situation between Facebook and College Network, one could view the situation as follows:

Logical: Both networks were conceived in a period of the founding of Social Network Sites on a broad basis. The concept was already well known (e.g. Friendster having already 3m members in 2004). Through the emergence of MySpace, one could even see College Network as having an advantage over Facebook by being closer to the status quo, giving users more options and individualization abilities (Beam 2010). The aspect of extra-logical factors is more towards a holistic perspective.

The first element is described by Tarde as "ab interioribus ad exteriora" and described using the example of children understanding words long before they can vocalize them (de Tarde 1962, p.332). It therefore implies a form of passive existence of an idea long before it actually gets executed. This could been seen in different aspects, for example in the common practice to call student directories colloquial "facebooks" as well as the attempts in Zuckerberg's high school to

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[27]   It bares a certain irony, that the work of an author so highly involved in the aspects of creating fashion, innovation and invention, received very little public attention of his own writings at his time (Czarniawska & Adler 2009). Of course, this should in no way discredit Tarde's writing; on the contrary one could argue that the right time was yet to come for his work to become broadly accepted in the academic community. In a similar way one could see Social Network Sites, such as SixDegrees.com from 2000 as an example of "something" whose time did not come (boyd & Ellison 2008).

establish an online version of this (Antonas 2009). Thus one could see this as attempts of different networks to vocalize similar ideas and intentions.

The second element points furthering a different direction: the influence of the creator, class and location.[28] The personalities of the founders of both networks appear to be similar only on the surface. Both were students of well known and respected Universities, both in their early 20s and both highly involved in technology. But when it comes to their personalities, the accounts of both characters seem to differ on many levels. Facebook was run as a Zuckerberg centric project (its early years featured as a footer under all pages "a Marc Zuckerberg production), and he still holds the majority of seats on the board of directors. Meanwhile, the approach chosen by Goldberg seemed to be far less aggressive. He turned down investment offers as well as offers for cooperation by companies such as MTV and described it later as "We would have if we thought the reason we couldn't succeed was because of money" (Beam 2010). Moreover, he developed a network targeted at high school students. The situation and his reaction to it, described by him as "They made me feel really bad for having launched it,... So I took it down."(Beam 2010) seems to stand in contrast to the aggressive actor enrolment strategies followed by Zuckerberg and colleagues.

The aspect of class would today probably be understood in a different context than the one Tarde had implied over 100 years ago. But still, the element of class can be seen as a central component of both networks. Both grew out of the elitism of Ivy League universities, and had to face intended elitism. But even here, one of the original team members of the Columbia Connect argued: "When we go to a school and say this site is from Columbia, it doesn't carry the same marketing punch as, 'This is from Harvard'"(Beam 2010). Finally, the element of location could be seen in two dimensions: At both Universities the housing-campus environment might spur the spread of something new, but while Columbia is embedded within a big metropolitan area (New York), Harvard is a more isolated community within Cambridge, MA, having a population of around only 100,000. Moreover, Zuckerberg strategically moved Facebook's business operations to the tech-intense area of Palo Alto, while Goldberg and his colleagues moved to Montreal, Canada for developing the website further. The significance of geographical locality for the contemporary art and technology is further discussed in Florida (2009) but already was a subject of research for Krugman (1991) as well as Lucas (1993).

The third element of Tarde's extra-logical aspects appears a bit more difficult to apply in this context. It could be explained in the aspect of association between past and present, which can explain the elements laid out in the previous segment. The interpretation of why actors, institutions or locations have a perceived superiority relative to others would go beyond the scope of this paper and is therefore excluded.[29]

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[28]   Tarde tends to glorify the inventor as an individual. This is somewhat problematic because there is very little of a classic inventor "eureka" moment in the story of Facebook. For the sake of the narrative, there is the element of an inventor assumed, although the innovator is in this case more of a translator between existing ideas and networks, thus has the role of initiator of a new meta-actor construct.

[29]   A thorough analysis would have to also look at elements such as by what means superiority is created from a historic perspective and maintained in the

9.5 The Path to Power: Facebook as a Continuity of Change

The enrolment of new actors in the Facebook network could be seen as a twofold process: First, the translation of the network in terms of elitism and selectivity, thus creating both a sense of exclusivity to those enrolled as well as filter function to let only selected actors join the network. This is followed some time later by an intense enrolment of new actors, both human and non human.

One aspect worth mentioning before going deeper into this subject is the aspect of actors and their joining of a network. Google had created a Social Network Site called Orkut even before Facebook was founded (boyd & Ellison 2008). While the website was mildly successful in the United States, it was able to align immense numbers of new actors in Brazil. This led to a conflict between the pre-existing actors within the network and new actors - on the basis of translation. Brazilian members communicated largely in Portuguese and enrolled new members very fast, which led to the alienation of existing members (Lord 2004). This phenomenon has turned only recently, when Facebook increased in popularity by gaining popularity with members of the upper class in Brazil (boyd 2010). It could be the case that exclusivity by itself does not prevent the network from becoming imbalanced, since both followed an approach of exclusivity in the beginning. But while Orkut followed a pure strategy of actors-enrolling-actors, the form of invitation was steered towards certain existing networks firs (e.g. Ivy League Universities). Therefore, the expansion of both could be seen as a matching of physical and virtual community, with the difference that Facebook did not allow its network to unfold according to a natural pattern, but built on the selective criteria which were imposed on actors in order to gain admission to an Ivy League University[30].

The stages of opening Facebook to new actors could be seen as consecutive events after the initial high level of selectivity. It followed the opening to all college students, soon followed by the opening to high school students (see also the CUConnect section on this), the opening to the general public, acquisition of companies, the opening towards 3rd party applications and connectivity with other networks. All of these could be seen as not only attempts to enrol new actors, but also to bridge the gap between meta actors. The close structure of Facebook allows each actor to create own networks, thus for example the creation of a new actor, whether it be human (e.g. new-user) or non human (e.g. new-application) without experiencing any changes within the existing usage pattern. Indications that this clustering permitted the growth of Facebook could be seen in the fact that changes in its core functionality generate controversy among actors, which even led at one time to the retraction of certain new functionalities (Story & Stone 2007).

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contemporary context, or even in how far these elements could be seen as becoming self fulfilling prophecies.

[30]   As for example by implementing filters, thus creating networks whose actor enrollment is based on intellectual achievement and/or power structures (Scott-Smith 2002).

9.6 Bringing in Bourdieu's Capital Theory

In the following discussion, Bourdieu's Capital Theory is applied with regard to the domination of Facebook and the allocation of different forms of capital. This should enhance the Actor-Network-Theory (and in this chapter, partially also Tarde) oriented observations into a more holistic, beyond the actor, perspective:

Financial Capital: The aspect of financial capital could be identified in different stages. From the father of a friend of Zuckerberg, who arranged meetings with potential investors (Kirkpatrick 2010), for the willingness on the one hand to accept external funding, on the other the refusal to sell the company. It could be argued that the expansion of the network was supported by the financial backing of actors who had only minor influence on the operational aspects of the expansion, thus allowing the growth of the network relatively free of financial objectives.

Cultural Capital: The aspect of a higher status could most obviously be identified in the enrolment process of the first actors. With a specific focus on those actors already belonging to a "selective" network, the accumulation of Cultural Capital might be seen as another central aspect, which is in this case identifiable at the most obvious level.

Technological Capital: Regarding the technological factor, two aspects appear to have the most obvious impact on development. One, in the person of Zuckerberg and his technologically skilled environment; the other in the relatively quick relocation of the company to a region with many pre-existing networks of highly technologically skilled actors.

Juridical Capital: The elements of judicial capital appear in various elements of the story. First is the attempt to keep the network free from conflict over intellectual property, by removing file sharing capabilities, second the issues over the subject of privacy, and third the ability to settle lawsuits surrounding the earlier controversies without substantial damage to the network itself and indeed buying the competing network, thus the enrolment of new actors.

Organizational Capital: This form of capital could be traced back to the early roots of the network. For example, the aspect that the persons involved in the early Harvard Connection Network did not pick an external developer to finish the software but instead choose Zuckerberg, and tried to solve conflicts by approaching the Harvard Administrative board rather than a public court/lawyer, demonstrate the organizational intention to negotiate the narrative within a network and to come up with a common translation without the help of outside-the-network-actors.

Commercial Capital: The aspect of commercial capital could be seen in both, the network as generating commercial capital in various forms, e.g. by selling Facebook credits and advertising, but as well as a platform basis for others to generate commercial capital. Further elements are the creation of fan pages and applications.[31] Thus the network does not only include commercial capital, but itself creates commercial capital for actors joining it.

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[31]   For example Zynga, the development company behind the highly popular Facebook application Farmville, is expected to reach a revenue of $500m in 2010 (Helft 2010).

Social Capital: The essential aspect of Facebook is within the "social" of the term "social network". This could be seen as a prime example how human and non human actors can form a network together. Thus, it could be seen that within the meta actor Facebook, many networks cluster together and generate social capital both within the sub-networks as well within the meta network. The social capital generating element could therefore be seen as the result of both human and non human actor interaction.

Symbolic Capital: The symbolic capital might again be traced back to its roots in an elitist environment. In similar ways as Orkut and large segments of its userbase were flocking towards Facebook partially certainly motivated by Facebook's upper-class appeal that it already demonstrated towards the users of MySpace (boyd forthcoming). It might therefore be seen as living to a certain degree of fame from the past, but having become a similar form of democratized "privilege" as Warhol once described Coca Cola: "You can be watching TV and see Coca-Cola, and you know that the President drinks Coke, Liz Taylor drinks Coke, and just think, you can drink Coke, too"(Warhol 1975, p.100).

9.7   Closing Remarks

This analysis of the emergence of Facebook, and its journey towards domination of Social Network Sites, focused on certain elements. Among these were the emergence of Facebook, the controversies surrounding it and the path to power. It continued to describe the competition and conflicts between competing Networks as well as its openness in enrolling increasingly non-human actors (e.g. in the form of applications etc). The path to domination was, in the case of Facebook, a relatively rapid process and can be attributed to a number of aspects. Among these stand unique aspects, for example the controlled enrolment of certain networks, exclusivity and elitism, the creating of individual networks and layering of real world and virtual networks, but as well the following of a basic democratic approach (e.g. one Facebook for everyone). In the context of the recent movie and its narrative, it seemed especially helpful to lean on Bourdieu's theory in order to better understand the role and relationship of Zuckerberg as an actor within the emergence of Facebook.

10   EPILOGE

The intention of this paper was to develop a richer picture on the emergence of dominant software applications while demonstrating how Capital Theory can enhance the descriptive Actor-Network-Theory perspective.

Since the intention of the approach chosen was not to develop definitive "results", I will refrain from trying to impose a comparative assessment between the proposed cases. In fact, the argument should be much more oriented towards how unique and different each case is, and how much complexity is hidden in the narrative. Of course, narratives bare risks, especially when narrating historic events without being directly involved within the emerging network. To minimize these risks, this paper leaned heavily on existing interviews, documents, manuals and blog postings to stay as close to the actors as possible, and only when no other resources were available were narratives of other "narrators" utilised.

In order to reflect the complexity and richness of the environments, the chosen methodological basis provided a compelling picture of the networks, actors and translations. This demonstrated the significance of the Actor-Network-Theory and its ability to give a voice to the surrounding translations and conflicts leading to market domination. The enhancement of Actor-Network-Theory with Czarniawska's ActionNet allowed not only the deconstruction of networks but also tracing of the initial stages leading towards the dominating scenarios.

The use of Bourdieu's Capital Theory demonstrated itself as an adequate form of uncovering elements which are harder to trace within "just" Actor-Network-Theory. It allowed not only for networks to be described, but also shine a light on the intentionality of the actors in order to explain the situations to larger degree. It led not to a final methodological construct, but a demonstration of how the combination of the different theories under the umbrella of Actor-Network-Theory can actually work.

Latour's essential statement, that there is no fixed form of Actor-Network-Theory, is vividly practised in this paper (Latour 2005). Using Actor-Network-Theory as a fixed framework, often the one applied in one of the early papers on Actor-Network-Theory by Callon (Callon 1986b), leads to the danger of a theory which aims on the one hand at deconstruction and flexibility, but ends up being applied as just another framework (e.g. Jeacle 2003).

This paper should therefore be seen as plea to break Actor-Network-Theory out of its established routine application but to see it as a guiding principle, and to freely and openly combine it with other available methods and perspectives. The paper ultimately proposes that a renunciation of the meta narrative should also lead to the renunciation of the meta theory. This is practised by bringing Actor-Network-Theory and Capital Theory together, and also by including Czarniawska's ActionNet as well as Tarde's dimensions of imitation according to the demands of the situation.

Further research on this subject should take the plurality of theories into consideration. The approaches applied in this paper demonstrate that a methodological flexibility can contribute substantially more to capturing the richness of networks, actors and interactions than just a methodological singularity. Further demands for research could be in the area of how spokespersons interact within networks (two-level situations), maturity of

networks (what happens after reaching the initial goal), and also of how Bourdieu's Capital Forms, which are at one point even described as "Strategic Market Assets" (Bourdieu 2005, p.184), and Porter's Five Forces/Competitive Advantage perspective could provide a potential starting point for re-thinking competition and consequently domination in markets.

On A Personal Note:

The method chosen for this paper carries an essential risk: It is heavily dependent on the author. The full complexity of events and details are impossible to wrap inside a paper like this, and an author has to make choices of which aspects to include and which have to stay out. In the end, this leads to an author developing an narrative which might, even with the best intention to do otherwise, reflect the viewpoints which the author wants to see, or to quote Bourdieu "The habitus [of the individual] is socialized subjectivity, a historic transcendental, whose schemes of perception and appreciation (systems of preferences, tastes, etc.) are the product of collective and individual history." (Bourdieu 2005, p.211).

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