

Technological Neutrality; What Does It Entail?

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Abstract

This article seeks to analyse thoroughly the emerging regulatory principle of technological neutrality. The emergence of the principle during the review process of EC Telecommunications regulation is explained. Consequently, the author uses arguments drawn from both economics and communications science to found the norm incorporated in the principle. Ultimately, four rationales for technological neutrality are identified, that show that the interpretation and implications of technological neutrality can differ depending on the rationale chosen.

Keywords: technological neutrality, regulatory principles, 2002 Electronic Communications Framework.

Introduction

The principle of technological neutrality was officially coined by the European Commission as a regulatory principle in its 1999 Communications Review.² This 1999 Communications Review Communication presented the results of a thorough review of EC telecommunications regulation, initiated in 1997 by the Convergence Green Paper.³ Technological neutrality was presented as one of five principles⁴ that would underpin the EC regulatory framework on Electronic Communications,⁵ that has been in place since 2002, and is currently under review.⁶

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² “Towards a new framework for Electronic Communications infrastructure and associated services. The 1999 Communications Review, COM(1999)539.

³ “Green Paper on the convergence of the telecommunications, media and information sectors, and the implications for regulation. Towards an information society approach, COM(97)623 (December 3, 1997),

⁴ The principles hold that future regulation should (i) be based on clearly defined policy objectives; (ii) be the minimum necessary to meet those objectives; (iii) further enhance legal certainty in a dynamic market; (iv) be enforced as closely as practicable to the activities being regulated; (v) aim to be technologically neutral. I would like to emphasise here that I indeed regard technological neutrality as a *regulatory principle*, and not as a *policy objective*. A perusal of the text of Article 8 of the Framework Directive, headed “policy objectives and regulatory principles”, confirms this; under paragraph 1 it is stated that the *policy objectives* underlying the Framework are set out in paragraphs 2, 3 and 4. Technological neutrality is only found in paragraph 1 of the Article.

⁵ The 2002 Electronic Communications Framework is comprised of six Directives:

According to the text of the 1999 Communications Review, technological neutrality means that “legislation should define the objectives to be achieved, and *should neither impose, nor discriminate in favour of, the use of a particular type of technology* to achieve those objectives”.⁷ This basic explanation however leaves quite some room for interpretation, which is illustrated by the fact that market parties, policymakers and legislators seem to adhere to different meanings of the principle, as they see fit. This situation can lead to unwanted consequences: the ongoing vagueness creates uncertainty in both theory and practice, with the risk that technological neutrality will not be taken seriously as a regulatory principle. This paper will therefore try to thoroughly analyse the principle of technological neutrality, so as to lead to a better understanding and application of the principle in the future.

This paper consists of three parts. First, the emergence of the principle will be explained; why was there no principle of technological neutrality before the extensive review of EC Telecommunications regulation?

Secondly, the normative value of the principle will be assessed. The principle of technological neutrality implies that one should try to remain neutral in regulation towards technology. The principle thus represents a norm; just as the principle of non-discrimination implies that discrimination is undesirable, so does technological neutrality imply that regulating in a technology-specific fashion is bad as well. The difference however is that where most people automatically agree that discrimination is reprehensible, the situation is somewhat different for

Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services ('Framework Directive') [2002] OJ L108/33; Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and associated services ('Authorisation Directive') [2002] OJ L108/21; Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities ('Access Directive') [2002] OJ L108/7; Commission Directive 2002/77/EC of 16 September 2002 on competition in the markets for electronic communications networks and services [2002] OJ L249/21; Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and associated services ('Universal Service Directive') [2002] OJ L108/51; Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector ('Directive on privacy and electronic communications') [2002] OJ L201/37.

⁶ See “Communication on the Review of the EU Regulatory Framework for electronic communications networks and services”, COM(2006)334.

⁷ “Towards a new framework for Electronic Communications infrastructure and associated services. The 1999 Communications Review, COM(1999)539.

regulating in a technology-specific fashion, or at least the opinions will be less outspoken. This paper will therefore first verify, with the help of economics and communications science, whether the norm represented by technological neutrality can be justified by arguments obtained outside the realm of law.

Thirdly, the principle of technological neutrality will be analysed from a legal perspective. In this part, various rationales that can underpin the principle of technological neutrality, partly extracted from the decision-making process that led to the 2002 EC Electronic Communications Framework, will be discussed and weighed.

A. Why the emergence of a principle of technological neutrality?

As said, the legal, EC concept of technological neutrality first emerged during the review process of EC Telecommunications regulation, that officially started in 1997. Even though technological neutrality has in the meantime also been applied to other sectors of EC law such as consumer protection law,⁸ it is safe to say that technological neutrality attracted most attention through its application in the sector of electronic communications.

With the 1997 Convergence Green Paper, the Commission delivered an elaborate work that not only sketched the various possible implications of convergence for the telecommunications, media and information technology sectors, but furthermore tried to instigate a debate on how to adapt regulation as a result thereof. The 1997 Convergence Green Paper only briefly refers to technological neutrality,⁹ but the concept clearly emerged in the public consultation rounds following the presentation of the Green Paper. Many commentators stressed the need for future regulation to be technology neutral, even though the statements were often left unexplained, and did not always seem to pursue the same goal. In contrast, the cause for their strive for technological neutrality univocally was technological convergence. As a consequence of convergence, different sectors (telecommunications, media and information technology) became able to make use of the same technologies. This drastically affected the way in which policymakers thought these industries had to be regulated.

Before convergence, the different sectors could said to be made up of their own, 'closed' systems. With traditional telecom, someone's voice (content) was transmitted through a copper line (network), which was finally delivered at the receiver's end. With traditional television, broadcasting programmes and movies (content) were produced, gathered and packaged, and then

⁸ See Green Paper on European Union Consumer Protection, COM(2001)531.

⁹ The Commission in its 1997 Convergence Green Paper only puts forward technology neutral regulation as a possible option to deal with the regulatory implications of convergence, see p. 21.

transmitted, first only by terrestrial means, later also by cable and satellite (networks) to the viewer. This means that even though the sectors of broadcasting and telecommunications were comparable in the sense that they both conveyed information (content) through various distribution means (networks), there was no possibility to share or exchange either content or transmission means with each other. This situation was entirely caused by technical limitations of the networks at that time; it was technically impossible to interchange the various networks. It is therefore not surprising that the two sectors were regulated independently. The IT sector was originally not even regarded as a network industry, but rather as a localized activity, and thus escaped public regulation.¹⁰

However, all this changed drastically as a result of technological convergence. Suddenly, different sorts of content *could* be transmitted over various networks, with as a consequence that traditional telecom companies would directly be competing with broadcasting companies and the newly emerging internet providers. Since regulation had until then been sector-specific, competing companies found themselves under different regulatory regimes. The initial call for technology-neutral regulation can therefore be explained by the fear of companies of facing a competitive disadvantage, caused by regulation. The European Commission responded to this call by taking up the principle of technological neutrality as a new regulatory principle, that now underlies the 2002 EC Electronic Communications Framework. One can thus conclude that the initial recognition of the principle of technological neutrality was primarily supplier-driven.

B. Should the State indeed try to remain neutral in regulation towards technology?

The principle of technological neutrality implies that the State should try to remain neutral towards technology when regulating. Since this norm can have far-reaching consequences, we will now consider in what way(s) this norm can be justified. First we will see what arguments can be taken from economic theory, after which we will proceed with arguments from communications science.

1. Does economic theory support technology-neutral regulation?

From an economic point of view, the main reason for State intervention in the market, i.e. the adoption of regulation, is the presence of a market failure. Market failure means that efficient functioning of a market is prevented, i.e. the market itself does not efficiently allocate goods and services. The economic concept of efficiency can be divided in static and dynamic efficiency.

¹⁰ See P. Larouche, *Communications Convergence and Public Service Broadcasting*, Tilec Discussion Paper 2002, www.tilburguniversity.nl/tilec/publications/discussionpapers/larouche2.pdf.

Static efficiency includes how well resources are allocated (allocative efficiency) and production decisions are made (productive efficiency) at a point in time. Dynamic efficiency on the other hand refers to the incentives to invest in research and development in the long run. Competition is generally seen as the best way to achieve both static and dynamic efficiency, however, it is not uncommon for a trade-off to exist between static and dynamic efficiency. For example, an intellectual property right such as a patent might have a positive effect on dynamic efficiency, but it has a negative effect on static efficiency.¹¹ Short-term regulation to induce competition generally has a positive effect on static efficiency (and thus efficiency in the short run), but has a negative effect on dynamic efficiency (and thus efficiency in the long run). Since market failure has a negative influence on consumer welfare, the State can consider to step in and regulate, so as to address and compensate the market failure. Several potential market failures have been identified in the economic literature on the market for information goods;¹² their *cost structure*,¹³ *asymmetric information*,¹⁴ *externalities*¹⁵ and the existence of *public good characteristics*.¹⁶ In

¹¹ When one has a patent one has a temporary legal ‘monopoly’ in the sense that during the period of the patent, the patent-holder is the only one that can rightfully produce the good and his financial rewards are thus secured. The rationale behind this is that without the patent, the incentive for research and innovation would be too little. When immediately after an invention competitors would be able to enter the market without having to go through the costly stage of research themselves, innovation would be discouraged. One can however also argue that static efficiency is actually deteriorated by the patent, exactly because it prevents competitors from entering the market for a certain period of time. For an introduction to the economics of intellectual property rights see: F. L  v  que and Y. M  n  re, *The Economics of Patents and Copyrights*, The Berkley Electronic Press (2004), www.bepress.com/leveque.

¹² See C. Shapiro and H. R. Varian, *Information Rules. A Strategic Guide to the Network Economy*, Boston: Harvard Business School Press, 1999; M. Appelman, M. van Dijk, R. Nahuis, B. Vollaard and D. Waagmeester, ‘Een economisch vooronderzoek ten behoeve van het rapport van de WRR over de media’, in: W.B.H.J van de Donk, D.W.J Broeders and F.J.P.M. Hoefnagel (ed.), *Trends in het medialandschap*, Amsterdam: Amsterdam University Press (2005).

¹³ The cost structure of information products is such that fixed costs are high, and marginal costs are low. This cost structure leads to economies of scope and scale that in turn tend to lead to market failure. For an introduction to these and further used economic principles see N.G. Mankiw and M.P Taylor, *Economics*, London: Thomson (2006).

¹⁴ Asymmetric information refers to a situation where it is impossible for the consumer of media content to know upfront how he will value the good. The only way to know this for sure is to *experience* the product, however, once that has happened, the incentive to still pay for the product will have decreased significantly.

¹⁵ Externalities arise if activities generate costs or benefits on third parties that are not internalised by the originator of the activity. The most well-known example of a negative externality is environmental pollution; a factory that dumps toxic waste in a river is not immediately affected by this. However, its action does create costs for third-parties, i.e. society, that are not internalised by the factory.

¹⁶ A typical public good is defined as being *nonrival* and *nonexcludable*. Nonrival means that the use of the information good by one consumer does not diminish the use of the good to other people. The same property is sometimes defined

principle, the State might thus have a reason to regulate. The subsequent, interesting question however is, whether the State should regulate in technology-neutral fashion. This question can be answered by the following.

(a) Market for information goods

Imagine a situation in which specific content has as a negative side-effect that adolescent viewers become very aggressive and tend to act on a suggestion made in the content. This can either be seen as an externality-problem, or as a social problem. The externality arises from the fact that the distributor of the violent content does not internalise the full costs caused by the violent content. Therefore, (relatively) too much violent content will be distributed. The social problem arises because a certain social goal, i.e. not exposing children to violent content, is not being achieved by the market. Regardless of the label, the regulatory goal will be the same: to restrict the distribution of violence.¹⁷

The State decides to regulate, but decides to do so in a technology specific way, meaning that violent content can only be aired on cable television after 8 p.m. The State however does not regulate the Internet TV, and consequently the content is available there around the clock.

	A1	A2	B1	B2
value	50	50	40	40
regulation		-20		-20
value-regulation	50	30	40	20

Figure

The above model represents a highly simplified version the a market for television. The two reception methods chosen are represented in the table by A (cable television) and B (Internet TV). Suppose that cable as a reception-method is normally (situation A1) valued by consumers at 50, and Internet TV(situation B1) is valued at 40. Now suppose, as described in the above case, that a State decides to only regulate cable television, hence reception method A. Will this influence the choice of the consumer, and if so, how?

as nonexhaustable. Nonexcludable means that it is difficult to exclude people who are not willing to pay from consuming the information good.

¹⁷ Due to the characteristics of the medium, it will not be possible to only target minors with regulation.

We assume that what the majority of the viewers want, is delivered by the broadcasters. Since broadcasters cannot differentiate between customers, they have no choice but to go with the preference of the majority.¹⁸ Thus, if the majority of the viewers want a restriction of the distribution of violent content, this will be taken care of by the market. When broadcasters do not voluntarily hold-up the distribution of violent content until 8 pm, we can assume that this is not what the majority of the viewers wants. We also assume that there is no coordination problem, i.e. the viewers are able to influence the broadcaster such that they get what they want.

For viewers that want violent content, regulation will decrease the value of reception method A, as represented by the model. If the regulator decides it wants to regulate the reception method for the benefit of the minority, it will reduce the value of this reception method for the majority. Consequently, the viewers that want violent content will switch to an inferior technology.¹⁹ Whereas before, regulation viewers valued cable-television over Internet TV, they will now prefer Internet TV. The switching by consumers is however not caused by competition or a superior technology and is thus introducing static inefficiency; consumers prefer cable television, but are choosing the inferior technology of Internet TV as the result of regulation. Moreover, technology-specific regulation will not solve the market failure, or reach the social goal. Since technology-specific regulation will make consumers switch to that reception method that is not regulated, i.e still distributes violent content throughout the day, minors can still be confronted with violence.

In the case above, it is assumed that the two reception methods are perfect substitutes, and thus competitors. This leads to the conclusion that – from a static perspective – technology-specific regulation has a negative effect, since goods are not allocated in accordance with the preferences of consumers. In contrast, technology-neutral regulation will not distort competition since it will equally affect the value of the different reception methods. Also, technology-neutral regulation *will* solve the market failure (or social goal) of the restriction of distribution of violence.

¹⁸ Traditional, free-to-air broadcasters had no choice but to go with the preference of the majority of the viewers (or advertisers) since they had no technical possibilities to make differentiated offers according to customers wishes. This ‘model’ is known as the point-to-multipoint model, see P. Larouche, *Communications Convergence and Public Service Broadcasting*, Tilec Discussion Paper 2002, www.tilburguniversity.nl/tilec/publications/discussionpapers/larouche2.pdf

¹⁹ Furthermore, an important assumption is that consumers can switch. If switching costs are so high that consumers cannot switch, technology-specific regulation might actually be statically efficient.

In addition, technology-neutral regulation might have an even stronger benefit from a dynamic perspective. Technology-neutral regulation can also have a positive effect on dynamic efficiency, i.e. competition in innovation, ultimately *for* the market. Nowadays, cable television and the InternetTV are not perfect substitutes yet. Most people use both television and the Internet in their households, and indeed, current broadband connections can not yet compete with the quality of traditional television distribution technologies such as cable. This might very well change in the next few years. The different reception methods are converging, at least partly because of technological developments. Convergence can on the other hand also be an (undesirable) effect of regulation. We already saw how consumers will switch to an inferior technology when one reception method is regulated whereas the other is not. The situation can become even worse when this leads to a specialization of the two reception methods in the model in the ‘wrong’ type of content. When cable television is the superior technology for distribution of violent movies, this is where economists would like to see these movies. If InternetTV is better suited for educational content, this is where this type of content should be distributed. When regulation now causes InternetTV to specialise in violent content (because this generates profits; consumers want it and it is forbidden on cable television), this will be a negative dynamic effect.

Furthermore, since technology-neutral regulation leaves (technological) choices to consumers, it will have a positive effect on innovation in general. Currently, the battle between TV and Internet is undecided, and maybe consumers will continue to use both in the foreseeable future. However, it might also be that the two media will converge further. If regulation then gives a bias to Internet because TV is regulated and is thus burdened with higher costs, chances are that Internet wins the battle; not because it is superior, but because it is not regulated. Technology-neutral regulation will give operators of both distribution technologies incentives to invest in broadband technologies in order to be able to compete.

(b) Market for broadband access

A second case can confirm these positive dynamic effects. The market for broadband serves as a good example. Several potential market failures can be identified in the market for broadband access such as abuse of market power, externalities and asymmetric information.²⁰ These market failures can in principle warrant intervention by the regulator. Suppose that two firms are both

²⁰ ‘See M. van Dijk, B. Minne, M. Mulder, J. Poort, H. van der Wiel, ‘*Do market failures hamper the perspectives of broadband?*’, CPB report, no. 102, December 2005, accessible at: <http://www.cpb.nl/nl/pub/cpbreeksen/document/102/doc102.pdf>

offering (retail) broadband access services, firm A through cable, and firm B through ADSL. We again assume that the two broadband technologies are perfect substitutes. Also assume that both firms have market power on their respective network, which causes the market to fail; prices are too high and consumers do not get the quality they want. Note the difference here with the previous example: whereas in the previous example the majority of the consumers are satisfied but the regulators decides to intervene for a greater social goal, this example is a 'simple' case of economic regulation. Consumers are suffering because of the behaviour of dominant players, as a result of which the regulator decides to intervene.

The regulator now decides to only regulate access to ADSL by imposing an entry obligation on the provider of ADSL. This is likely to improve static efficiency, since new players will enter the market and offer ADSL at a lower price in order to compete. Being perfect substitutes, the cable operator will also follow and lower its prices, since it will have to prevent that its customers will shift to the cheaper and substitutable technology of ADSL. Therefore, the technology-specific regulation of ADSL will most probably have a neutral result. By opening up the market of ADSL, the regulator forces the operator of the cable to follow the price decrease; entry-regulation will thus be likely to cause a general decrease in price. When the amount of the decrease in price of cable and ADSL is the exact same, consumers will probably not switch but stick to their original preferences. When the price of ADSL becomes significantly lower than that of cable (i.e. cable does not follow), consumers are likely to switch. This situation however differs from the previous example because consumers that switch to the competing network, do that because the value of the loss in quality is compensated by the gain due to the reduction in the price they pay. Hence, the static effect on welfare is neutral. In both cases, prices will go down for consumers and technology-specific regulation will not be problematic from a static perspective.

Nevertheless, entry regulation of ADSL will most probably reduce the incentive of the ADSL operator to invest in its network, as it will claim it is hard to recoup investments when new competitors (i.e. entrants) can free ride on its investments. Similarly, the cable provider will also not be motivated to innovate, since it already finds itself in a luxurious position of not being regulated. Technology-specific regulation will thus be highly inefficient from a dynamic perspective. Currently, (incumbent) network operators are put under pressure to replace their existing networks with so-called next-generation-networks (i.e. fibre), so as to enable the development of new media services. Technology-specific regulation would therefore be a dangerous strategy to take. Technology-neutral regulation will not be able to entirely solve the

situation of the transition to next-generation-networks, but will in any event not make it even more problematic than it already is.

2. Does economics provide any reason to deviate from technological neutrality?

It is important to bear in mind however, that when a regulator decides to regulate ADSL purely because of (an abuse of) market power that does not exist for cable, this delivers a different outcome. After all, in that case, the regulator would actually have a reason to regulate only the provider of ADSL, because the market failure only arises for that specific technology. One could even argue that when the regulator would have solid evidence that ADSL is especially prone to market failure, this would be a reason to regulate on the basis of that technology (i.e. “a provider of an ADSL network needs to provide access to competitors”). A preferred solution would nevertheless be to regulate on the basis of the market failure. The possible market failures identified on the market for broadband access are not caused by certain technologies; certain technologies might just be more prone to market failures than others. Instead of taking the *technology as the starting point* for regulation in these cases, the regulator should therefore rather take the *market failure as the starting point* for its regulation.

The same reasoning also applies to the potential market failures identified earlier on the market for information goods. Here chances are even less likely that the occurrence of a market failure can be influenced by making use of a certain technology or a medium. The specific *cost structure* of information goods (high fixed costs, low marginal costs) for example, is the consequence of the fact that producing information is expensive, whereas reproducing it is relatively cheap. In other words: the cost structure is intrinsic to the content of the good, and does not change significantly by bundling the information to a different carrier. Whether one produces a documentary with the intention to air it on television or spread it through the Internet, the fixed and therefore larger part of the costs will be equally high. The issue of *information asymmetry* does not change either with the use of another medium or technology. The difficulty that a person cannot know upfront how he will value the movie he is buying on DVD is again intrinsic to the content of the good, and will not change when he or she decides to watch that same movie through Pay-TV. A similar argumentation can be applied to the problem of *externalities*. Again, the externality is not dependent upon the carrier or distribution method, but dependent on the content. One could perhaps argue here that the choice for a medium with a larger audience reach, i.e. larger impact, would influence the occurrence of an externality. However, the occurrence of the externality then depends on the *reach* of a medium, and not on the medium *itself*.

The issue becomes more complex when the market failure is caused by so-called *public-good* aspects of information goods. The two defining elements of a public good are nonrivalry and nonexcludibility.²¹ Nonrivalry can also be identified as intrinsic to the content-element of an information good; it is the content that cannot be exhausted, and therefore does not diminish the utility of the good. However, the nonexcludability element of some information goods is not inherent to content; rather, this aspect is dependent on technologies and/or legal systems. An analogue, terrestrial broadcast can indeed be nonexcludable from a technological perspective, and therefore the market failure can actually be dependent on the distribution mechanism.²² Nevertheless, the fact that the *market failure* in this case is *technology-specific*, does not necessarily mean that it is wise for the regulator to regulate in a *technology-specific* fashion. We have already seen that technologies are developing rapidly and therewith converging. Consequently, the dynamic perspective urges/justifies the regulator to rather address the market failure than the technology in its regulation.

Another potential reason to deviate from technology-neutral regulation might come from the dynamic perspective. When a situation occurs in which choices between two technologies cannot be made freely by consumers, technology-specific regulation might be used to restore the ideal, competitive situation in the market. *Network effects* in combination with *path dependence* could lead to this situation.

Network industries (such as telecom and broadband) are markets that feature increasing returns to scale. This is, as mentioned before, caused by the cost structure of the industries; fixed costs tend to be high, whereas marginal costs are low. Software provides a good example: the first copy can cost millions of euros to develop; the second copy will only cost a couple of euros. A second characteristic of network industries is that they in general show extreme market share and profit inequality, i.e. winners-take-all markets.²³ This is caused by network effects; consumers will value their telephone more when all their friends and relatives have one; it would be worthless when they actually could not contact anyone with it. These *network effects* feed back to even higher sales for a firm with an already large market share; after all, the more consumers

²¹ See footnote 16.

²² Even though one could still make it excludable by way of law, for example by making people pay a license fee.

²³ Nicholas Economides, "Competition policy in network industries: An introduction. p. 1-29, p. 12., accessible on <http://www.stern.nyu.edu/networks/site.html>

already have the product, the more interesting it becomes to have one as well. These network effects can lead to a problem when they are combined with path dependence and lock-in to an inferior technology.

Path dependence is about dependence upon decisions made in the past. The economic theory of path dependence claims that the outcome of a battle between potential standards for a technology can depend on something futile as the decisions of a few early adopters, with the possible implication that the market is locked in into an inferior technology. Two commonly used examples to back the theory are those of the battle between the QWERTY and DVORAK type board,²⁴ and the battle between BETAMAX and the VHS Video recorder.²⁵ When the utility that a consumer derives from a product depends not only upon its own utility, but, because of network effects also upon the utility derived by others, the chances of path dependence will increase. If a consumer wants to buy a video-recorder, an important consideration will be whether he can exchange tapes with his friends and family, and whether the local video-store is renting out videos that are supported by the video-recorder he buys. Consumers will thus tend to base the decision on what product to choose on their expectations of what others will do. As soon as one technology has then acquired a certain customer base, it will be hard to replace that technology with a new competing technology, since network industries have the characteristics of winner-take-all markets.²⁶

One can probably understand the motive of a State wanting to intervene in a situation in which a market is locked in to a certain technology, especially when one knows that a superior alternative is available. In contrast, economists would say that there is no such thing as the right outcome of a battle between technologies; whatever the market chooses is the right outcome. When consumers no longer have a choice however, the regulator could go as far as opening up

²⁴The first article to introduce the Qwerty story was Paul David. P. A. David, 'Clio and the Economics of Qwerty', *American Economic Review* (75) 1985-2, p. 332-337.

²⁵ Both stories have often been used to argue that a superior technology can be overtaken by an inferior one, due to reasons of path dependency and lock-in. The DVORAK type board was claimed to be superior to QWERTY, but failed to become the standard because consumers were already used to, and thus locked into, QWERTY. In the case of BETAMAX and VHS, BETAMAX was claimed to have the superior technology for video cassette recorders, but was nevertheless overtaken by VHS. Liebowitz and Margolis however have seriously questioned the QWERTY story, see: S. J. Liebowitz and S. E. Margolis, *Winners, Losers & Microsoft*, Oakland: The Independent Institute, 1999.

²⁶ Nicholas Economides, 'Competition policy in network industries: An introduction.' p. 1-29, p. 12., accessible on <http://www.stern.nyu.edu/networks/site.html>

possibilities to be able to choose again, for example by imposing interoperability standards on companies, or the un-tying of their products. A good and recent example of these practices are the obligations imposed by the Commission on Microsoft to disclose interface documentation which will allow competitors to achieve full interoperability with Windows PCs and servers, and to offer Windows *without* Windows Media Player.²⁷ Once again however, this can be accomplished by regulating on the basis of market failure just as well as on the basis technology, albeit without introducing the negative dynamic effects.

Economics thus provides strong evidence on what should be the relationship between technology and regulation; from an economic perspective, the regulator should indeed try to remain neutral towards technology in regulation.²⁸ The following part will assess whether communications science can add anything to support the norm incorporated in the principle of technological neutrality.

3. Does communications science support technological neutrality?

It is not uncommon, especially in American and German legal literature and case law, to find the special ‘impact’ of broadcasting on its viewers as a justification for stronger regulation – and thus as a justification for technology-specific regulation. In both these legal systems, broadcasting is assumed to have a *special impact on the formulation of an opinion*. The German Constitutional Court has held that its *spread effect*, its *suggestive power* and its *topicality* are the elements that together constitute this special impact of broadcasting.²⁹ Similarly, the Supreme Court of the US has held that the ‘uniquely *pervasive presence* in the lives of all Americans’ is one of the factors that justify stronger regulation of broadcasting. In addition, the Court held that “prior warnings *cannot completely protect* the listener or viewer *from unexpected program content*”, and also, “broadcasting is *uniquely accessible to children*”.³⁰

²⁷ Commission Decision of 24-03-2004, C (2004)900 final (Microsoft case).

²⁸ One could in addition argue that besides reasons of market failure, another reason for State intervention in the market could be the presence of merit goods. A merit good is a good that is generally undervalued by consumers such as education, art and culture. Aside from the fact that this reasoning is quite controversial due to the paternalistic motives that underlie the reasoning (‘the State knows what is best’), one can argue that the State is not concerned with *how* the consumer is consuming a merit good such as culture, but that it *is* consuming the merit good. Therefore, this also brings no justification for the State to regulate or intervene in a technology-specific fashion.

²⁹ BVerfGE 90, 60.

³⁰ Federal Communications Commission v. Pacifica Foundation, 438 U.S. 726 (1978).

Few people will deny that the media influence the way we see the world and formulate our opinions. Nevertheless, it is uncertain whether broadcasting indeed has a stronger impact on us than do other media. Lee C. Bollinger argued as early as 1976 that “the impact thesis is a dangerously amorphous justification for regulation”.³¹ According to Bollinger, imposing stronger regulation on media with a larger audience reach and impact not only conflicts with the underlying purpose of freedom of speech, but is also at odds with the fact that there just is no evidence that supports the theory that television indeed has such a special impact. In order to test whether the State should try to remain neutral towards technology when regulating, it is interesting to see if technologies indeed have this capability of influencing the impact of content. Since communications science (among other things) studies the impact of mass media, this is where I will look for evidence.

When communications science would now demonstrate that different technologies indeed have a different impact, this could be a justification for technology-specific regulation, that is *if that difference in impact is a concern*. Thus, when communications science would be able to attribute an impact to television that would be incomparable to any other technology, this *could* be a justification to regulate ‘on the basis’ of television, i.e television-specific. However, when communications science would indicate that different technologies have similar degrees of impact, this would not give an incentive for technology-specific regulation, but will from a legal perspective at least, provide some argument for technology-neutral regulation.

One has to bear in mind that this reasoning is in fact a legal reasoning; communication scientists, unlike lawyers and economists, do not automatically connect consequences for regulation to their findings. This is why the last addition of “if that impact is a concern” is crucial in the above reasoning; only if (the larger degree of) impact is seen as problematic, can it be used as a justification for technology-specific regulation. To be clear: it is not the purpose of this paper to analyse all evidence that can be found within the science of communications. It will merely, by making a selection of available information, try to test the tenability of the norm of technological neutrality in the light of communications science.

A preliminary question is what kind of research (methodology-wise) can be used as evidence for the thesis; if a study focuses on the effects of violence on television only, and this study proves that there indeed is a causal link between media violence and aggression, is this then sufficient to

³¹ L. C. Bollinger, ‘Freedom of the press and public access: toward a theory of partial regulation of mass media’, (75) Michigan Law Review (1-42), 1976-1977.

claim that television has a special impact? Or is it necessary to decouple the content from the medium and do comparative research by comparing the effects of identical content delivered through different delivery mechanisms? For the purpose of this paper, it will be assumed that technology-specific research is not sufficient to serve as evidence for the thesis, and that it is indeed necessary to decouple the content from the medium.

(a) Evidence from communications science

Communications science evolved out of the rise of mass media such as television and newspapers. Not long after their introduction, concern started to grow about the effects of these mass media. After all, never before had it been that simple to reach such large audiences in a relatively undemanding fashion. It was for example feared that propaganda by means of these new mass media would be able to produce mass reaction, a fear that was mainly fed by events such as the (in)famous hear play “War of the Worlds”.³² Three main approaches can be identified within communications science³³ that try to reflect on the impact of media on the public: the *powerful media approach*,³⁴ the *active audience approach*³⁵ and the *audience cum content approach*,³⁶ Typical for the ‘powerful media approach’ was the considerable, direct power that

³² The hear play of the War of the Worlds was aired on the 19th of October 1938, and involved a very realistic representation of aliens invading North America. In the show, interviews were held with (fake) authorities and eye-witnesses. Already during the show, listeners started to panic; they were calling friends and family to inform them about the invasion, and some even fled out of their homes. Afterwards, this reaction by the people was often brought up to illustrate the power of the media.

³³ C. De Boer and S. I. Brennecke, *Media en Publiek. Theorieën over media impact*, Amsterdam: Boom, 1999.

³⁴ The first communication models were all, in one way or the other, based on the stimulus-response idea. This idea implied that the media would send out a certain message, to which the public would then respond. In these first, traditional models created by communications scientists, *the mass media were assumed to have major power, and audiences were believed to be no more than passive receivers*. A generic term to address these first models is the ‘direct effects-model’, but the general theory is mainly known as the powerful media approach.

³⁵ Following the phase in which the power of the media was more or less assumed, a period begun in which researchers turned more to empirical research, which led to a new theory in communications research: the active audience approach. Within this theory that seriously affected the idea of the all-powerful media falls the ‘uses and gratifications approach’. This approach turned the ‘direct effects model’ upside down: the public were seen as active individuals, as the selectors of messages, and the media were dependent on these choices. In this model the audience is having the power, ‘deciding’ what media to choose.

³⁶ Finally, a third school can be distinguished in communications research, namely the audience cum content approach. Within this approach, attention is being given to both the content and the audience. A well known approach within this school is Gerbner’s cultivation theory. The theory of George Gerbner falls within the domain of effects research, but

was attributed to the media in influencing the public's opinion and beliefs, and the idea that a media message would have a universal response. This perspective quickly needed to be adjusted as a consequence of later research that has led to the 'active audience' and 'audience cum content approach'. Both approaches have added different variables – 'mediating factors'- in between the message and the response such as personality, gender, age, social background, viewing conditions and stage of cognitive development.

A first, interesting insight is that communication scientists in their research do not seem to focus on the potential effects of *media* itself, aside from the *message* they convey. Within all three approaches (referred to above) that study media effects, the message or content that is sent is the focus, and often even the starting point for their analysis. For example, there are many studies that have investigated the effects of violence on television.³⁷ However, the starting point in these research projects often is violence in the form of a movie and thus content, and the research projects generally do not compare different media distributing the same content. This means that on the basis of this sort of research, it is very difficult to attribute effects to the medium itself. This interesting insight was noticed by Joshua Meyrowitz in 1985.³⁸ This approach by communication scientists can be interpreted in two ways: one the one hand one can argue that the media are seen as *neutral delivery mechanisms* and therefore do not require special attention in their models. On the other hand one can also argue that to communication scientists, the *type of medium and the type of content are inseparably linked*.

Scholars that *have* engaged in separating the medium from the message in their research are so-called media-theorists or media-determinists. Well-known scholars in this area are Harold. H. Innis and Marshall McLuhan. Unfortunately, the research of these scholars does not focus on comparing the impact of different media at one specific period in time on individuals, but rather

rather than emphasizing effects on *behaviour*, it emphasizes effects on *attitudes* of people. His research studied how exposure to mass media influenced the consumer's view on reality.

³⁷ J. Freedman, *Media Violence and Its Effect on Aggression: Assessing the Scientific Evidence*, University of Toronto Press, 2002.; L.R. Huesmann and L.D Taylor, 'The case against the case in media violence', in D. Gentile, *Media Violence and Children*, Westport: Greenwood press, 2003. ; S.L Smith and E. Donnerstein (2003) 'The problem of exposure: violence, sex, drugs, and alcohol', blz. 65-95 in D. Ravitch en J.P. Viteritti (eds.) *Kid Stuff, marketing, sex and violence to America's children*, Baltimore/London: The John Hopkins University Press.; R. B. Felson, 'Mass Media effects on Violent Behavior', *Annual Review Sociology* 1996-22, p. 103-128.

³⁸ J. Meyrowitz, 'Media and behaviour-a missing link', in:D. McQuail, *McQuail's Reader in Communication theory*, London: SAGE Publications 2002, p. 99-107.

on how large-scale changes of modes of communication affect society over time in general. Innis for example tried to show how the different potentialities of media for control can lead to shifts in social and political power.³⁹ McLuhan became famous with his quote “the medium is the message”. In his standard work “Understanding media”,⁴⁰ McLuhan divided the different media into hot⁴¹ and cold⁴² media, to subsequently argue that transitions from one to the other would be able to seriously distress a society. One can understand that the work of these scholars is of little assistance in delivering evidence on the so generally assumed special impact of broadcasting. However, the work of scholars like Innis and McLuhan did inspire a new generation of (communication) researchers to start taking the medium into account in their research.

A few research projects can be mentioned here in which content and medium are separated, with the purpose of examining the effects of media on individuals. The research of Dimitri Christakis et al⁴³ is one of few studies that has tried to assign effects to television as a medium per se. In this study, researchers have tried to prove that exposure of children at the early age of 1 to 3 to television negatively affects children’s attention spans once they have reached the age of 7. This research diverges from earlier research since the *content* the children were watching was entirely left out of the analysis. The outcome of the study indicated that early television exposure can indeed be associated with attention problems at the age of 7. However, soon after the publication of the results, critics disputed the methodology of the research.⁴⁴

Comparative research in the area of education (the influence of media on learning) has dealt with the question whether or not a medium has the ability to influence the learning process. Clark for example has claimed in multiple articles⁴⁵ that media deliver no learning benefits, meaning that

³⁹ H. A. Innis, *The Bias of Communication*, Toronto: University of Toronto Press, 1951.

⁴⁰ M. McLuhan, *Understanding Media*, London: Routledge, 1964.

⁴¹ *Hot media* are media that extend one single sense in ‘high definition’, meaning that there is very little left for the recipient to fill in. Examples he names are radio, movie and photograph.

⁴² *Cold media* on the other hand offer less information, requiring more participation of the recipient, such as telephone and cartoon, but also television.

⁴³ D. A. Christakis, F. J. Zimmerman, D. L. DiGiuseppe and C. A. McCarthy, ‘Early Television Exposure and Subsequent Attentional Problems in Children’, *Pediatrics* (113) 2004-4, p. 708-713

⁴⁴ R. L. Bertholf and S. Goodison, ‘Television viewing and attention deficits in children’, *Pediatrics* (114) 2005-2, p. 511.

⁴⁵ R. E. Clark, ‘Reconsidering research on learning from media’, *Review of Educational Research* (53) 1983-4, p. 445-459.; R. E. Clark, ‘Confounding in educational computing research’, *Journal of Educational Computing Research* (1) 1985-2, p. 445-460.; R. E. Clark, ‘Media will never influence learning’, *ETR&D* (42) 1994-2, p. 21-29.

the use of a certain medium when educating children is not increasing the effectiveness of the education. Clark alleges that it is not the *media* but the *methods* or *content* that influences learning, however, this research is also contested by competing scholars that claim that certain learning benefits are indeed caused by media or media attributes.⁴⁶

Another line of research that is of interest here is research in which children's recollection of news, presented through different media, is being compared. In this research, the recollection of news presented in text and audiovisual form is compared. The rationale for the research is the common presumption among communication researchers that television is not an effective information medium; the development that an increasing number of people are relying on audiovisual sources for their news was thus seen as a negative development. Print on the other hand was considered to be a much more effective medium, because it gives the reader the opportunity to re-read, thereby giving the reader a better opportunity to exercise control over the processing of the information. Initial research in the area showed that children had a better recollection of 'audiovisual news', whereas adults had a better recollection of 'text news'.⁴⁷ This research inspired to do subsequent research in order to find explanations for this difference in result.⁴⁸ Two possible explanations were suggested and examined: the so-called 'reading proficiency explanation' and the 'semantic overlap explanation'. The 'reading proficiency explanation' is based on the idea that children's reading skills are less well-developed than adults', and therefore they cannot fully benefit from the re-reading opportunities that print offers. This would then explain why adults seem to better recall print news, whereas children's recollection of television news is better. The 'semantic overlap explanation' is based on the idea that the semantic overlap between visual and verbal content enhances the effectiveness of the

⁴⁶ Media attributes are specific capacities or characteristics of a certain medium such as the ability to zoom into detail.

⁴⁷ See among others: M. L. DeFleur, L. Davenport, M. Cronin and M. DeFleur, 'Audience recall of news stories presented by newspaper, computer, television, and radio', *Journalism Quarterly* (69) 1992-p. 1010-1022, L. B. Facorro and M. L. DeFleur, 'A cross-cultural experiment on how well audiences remember news stories from newspaper, computer, television, and radio', *Journalism Quarterly* (70) 1993-p. 585-601, A. Furnham and B. Gunter, 'effects of time of day and medium of presentation on immediate recall of violent and non-violent news', *Applied Cognitive Psychology* (1) 1987-p. 255-262.

⁴⁸ J. H. Walma van der Molen and T. H. Van der Voort, 'Children's Recall of Television and Print News: A Media Comparison Study', *Journal of Educational Psychology* (89) 1997-1, p. 82-91, J. H. Walma van der Molen and T. H. Van der Voort, 'Children's and Adults' recall of Television and Print News in Children's and Adult News Formats', *Communications Research* (27) 2000-2, p. 132-160, J. H. Walma van der Molen and M. E. Klijn, 'Recall of Television Versus Print News:

Retesting the Semantic Overlap Hypothesis', *Journal of Broadcasting & Electronic Media* (48) 2004-1, p. 89-107.

conveyance of information. Since the semantic overlap in children's news is greater than in adults' television news,⁴⁹ this could also explain for the difference in recollection between print and television for adults and children. The outcome of the latest research by Walma van der Molen and Klijn was that the common assumption that television is a less effective medium to convey information can be challenged by evidence delivered in line with the 'semantic overlap explanation'.⁵⁰ The better recollection by children of television relative to print was explained in their research by the greater semantic overlap in children news. In children news, it is common that a story is accompanied by pictures of relevance to the story. The better recall by adults of print over television was explained by the existing lack of semantic overlap in adult news.

Millwood Hargrave and Livingstone have together extensively reviewed recent (post 2000) media effects research.⁵¹ In their work, they point out several difficulties with researching media effects and the results thereof in general, ranging from methodological to ethical problems. They indicate that various media-effects studies make use of experimental methods, which are often contested for delivering *artificial results*. Also, many research projects (especially survey research) are designed to prove *correlational* rather than *causal* links between the use of media and the effects. On top of that there are, correctly so, *ethical constraints* that researchers have to deal with; one cannot for example confront children to explicit violent content to see whether it will or will not harm them in the long run. Also, it is theoretically recognised that multiple factors (education, upbringing, social background etc.) influence the outcome of media exposure, and it is methodologically *extremely difficult to separate these factors* such that the results can be awarded to the medium solely. Lastly, *much of the existing evidence is US-based*, which brings up the question how results from a country with different regulation and culture can be 'translated' to the European context.

So far, there is relatively little work that has actually studied the effects on behaviour of identical content across different media, a finding that is confirmed by Millwood Hargrave and Livingstone.⁵² Moreover, they indicate the findings of the little research that has been done tend

⁴⁹ In general, children's news shows more pictures and is less verbal orientated than adults news, in order to make the material more comprehensible for the children.

⁵⁰ J. H. Walma van der Molen and M. E. Klijn, 'Recall of Television Versus Print News: Retesting the Semantic Overlap Hypothesis', *Journal of Broadcasting & Electronic Media* (48) 2004-1, p. 89-107.

⁵¹ A. Millwood Hargrave and S. Livingstone, *Harm and offence in media content*, Bristol: Intellect books, 2006.

⁵² *Infra*, p. 16.

to be inconsistent; sometimes the effects of television are greater than those of videogames, sometimes vice versa.⁵³ The research difficulties set out above makes one wonder whether, even when comparative media research will be done, researchers will ever be able to award a special impact to a medium or technology. Surprisingly though, Millwood Hargrave and Livingstone question technology-neutral regulation, because of the lack of comparative media research. They however leave aside the question how the current strong regulation of television – compared to other media – can be justified on the basis the existing media effects evidence. To strengthen their position, they bring forward that the response of people to media content is strongly shaped by the characteristics of media, such as access conditions and public expectations. One can however easily argue that, because of convergence, these characteristics are no longer inherent to specific media or technologies, and only temporally tenable at most. Furthermore, when the State would still be concerned with the effects of a specific medium, it could always use the trigger of impact for its regulation, instead of basing its regulation on a technology. Thus, when a certain ‘degree of impact’ can be proven for a specific medium, regulation will be imposed. This would for example mean that as soon as Internet has the same impact as television, similar (content) regulation could be imposed. How impact will be defined (reach, modality, capability of control), and what will be the degree that triggers regulation, will have to be decided and properly explained by the State. With this, the State would not only avoid a conflict with the principle of technological neutrality, but also provide a flexible instrument to deal with future technologies. Since until now, the outcome of the various media effects studies do not give unequivocal evidence that certain media have a different impact than others, it is difficult to justify technology-specific regulation, i.e. regulating on the basis of a technology. Yet, communications science does deliver evidence that the State can use when it wants to use impact as a trigger for regulation. Regulation on the basis of impact can, like the market-failure reasoning, have as a consequence that only one specific medium is regulated. This will not be in conflict with technological neutrality, since regulation will not be based on a medium or technology, but on impact. In addition, this would prevent the State from basing regulation on technology when the research is inconclusive at most.

⁵³ *Infra*, p. 203.

C. A legal perspective on technological neutrality

We have now seen that economic theory provides a solid basis for technological neutrality.⁵⁴ Communications science does not provide a basis for technology-specific regulation, and only provides an 'indirect' basis for technology-neutral regulation. These conclusions are based on a very rough definition of technological neutrality, namely that the State should try to remain neutral towards technology when regulating. The next section will however demonstrate that the complex regulatory principle of technological neutrality cannot always fully be 'captured' by this rough definition, as a consequence of which it remains unclear in which situations technological neutrality can actually be invoked, and what the implications of its application will be. Therefore, the following part will analyse more deeply the regulatory principle of technological neutrality. It will assess whether the regulatory explanation of the principle of technological neutrality coincides with the efficiency argument delivered by economics, or whether there might also exist other, more law-specific explanations. The area of electronic communications will be used as the primary example, as this is the area in which the principle has recently attracted most attention, and is most often applied.

I will argue that *four rationales* exist for the principle of technological neutrality, and that, depending on the rationale chosen, the interpretation and implications of technological neutrality will differ.⁵⁵ These four rationales are *non-discrimination, sustainability, efficiency and consumer certainty*. The following part will not only explain the origin of each of these four rationales, but also how they interlink, and affect the outcome of the application of technological neutrality.

1. Non-discrimination

The initial rationale for introducing the principle of technological neutrality in the sector of Electronic Communications was undoubtedly *non-discrimination*. When the principle of technological neutrality was taken up by the Commission, the main aim of the principle was to make sure that regulation of electronic communications services would no longer be dependent on the technology used to provide the service with, so as to create a level-playing field. The

⁵⁴ It must be remembered that the principle of technological neutrality is not absolute; exceptions could be possible provided they are justified and proportionate. The Commission itself has indicated this much in the State aid cases concerning the funding of broadband (see for example Case State Aid C-35/05) and the Commission's Communication on accelerating the switchover from analogue to digital broadcasting, COM(2005)204 final.

⁵⁵ See also the book section of B. J. Koops, 'Should ICT regulation be technology-neutral?' *TILT, Starting Points for ICT Regulation. Deconstructing Prevalent Policy One-Liners*, TMC Asser Press 2005, p.

technological developments such as convergence and digitisation that had led the review of European Telecommunications regulation could no longer justify making a distinction on the basis of technology, since this would have as result that competing firms, offering the same services, would find themselves under different regulatory regimes.

It is interesting to notice that technological neutrality was initially not given the status of 'principle' by the Commission when the term was included in the 1997 Green Paper on Convergence. Technology-neutral regulation was rather put forward as one of many possible regulatory solution(s) to deal with the consequences of convergence. However, in the two consultation rounds that followed after the publication of the 1997 Convergence Green Paper,⁵⁶ technological neutrality attracted significant attention from market parties, to such an extent even that the Commission was in the position to conclude that there was general agreement amongst the commentators that future regulation needed to be technology-neutral, and that existing rules would need to be adjusted where this was not the case.⁵⁷

The meaning of technological neutrality, based on the rationale of non-discrimination, is that regulation should not favour one technology over the other because this would distort competition. As long as regulation is not discriminating between technologies, it will be in compliance with technological neutrality. A good example of this interpretation of technological neutrality is the manner in which the definition of an 'electronic communications network' of the Framework Directive is drafted;

“ ‘electronic communications network’ means transmission systems and, where applicable, switching or routing equipment and other resources which permit the conveyance of signals by wire, radio, by optical means or by other electromagnetic means, including satellite networks, fixed (circuit- and packet-switched, including Internet) and mobile terrestrial networks, electricity cable systems, to the extent that they are used for the purpose of transmitting signals, networks used for radio and television broadcasting, and cable television networks, irrespective of the type of information conveyed.”

This definition demonstrates that, irrespective of the technology, all networks used for the conveyance of signals fall within the application of the Framework. This interpretation of

⁵⁶ Green Paper on the convergence of the telecommunications, media and information sectors, and the implications for regulation. Towards an information society approach, COM(97)623 (December 3, 1997),

⁵⁷ Summary of the results of the public consultation on the green paper on the convergence of the telecommunications, media and information technology sectors; areas for further reflection, SEC(98)1284.

technological neutrality will lead to the least complex implications, in terms of regulatory changes.

2. Sustainability

A second possible rationale for technological neutrality is sustainability. This rationale is already explicitly put forward by the Commission itself in the 1999 Communications Review, and is particularly credible in the sector of electronic communications. In this sector, new technologies are developed everyday and are succeeding each other at an ever-increasing pace. As a consequence of this, it is virtually impossible for the legislature or regulator to keep up with this pace and adapt both legislation and regulation accordingly. By implication, regulation that is based on a specific technology thus is quickly outdated. Hence the second rationale for technological neutrality, i.e. sustainability: if the State wants to avoid lawmakers having to revise the law every few years or even months (i.e. make the law sustainable), it will have to make sure that its laws are not based on technology. This will not only have a positive effect on the work of lawmakers, but also have as an effect that market parties will be less reluctant to invest in new technologies. After all, market parties no longer need to fear that some new regulation (especially drafted for this new technology) will radically change their legal situation and subsequently undermine their investments.

The consequence of technological neutrality based on sustainability is thus regulation that is both flexible and open to technological change. The implications of this rationale for technological neutrality can differ from those of non-discrimination; whereas the latter is concerned with the *scope of application* of regulation, the former imposes requirements on the *form* of regulation. Whereas the definition of ‘electronic communications network’ can be said to be in conformity with technological neutrality based on the rationale of non-discrimination, it is explicitly referring – seemingly – to all existing technologies. Therefore, one can argue that it is not entirely providing the open and flexible framework that technological neutrality based on the rationale of sustainability calls for. In order to comply with that rationale, lawmakers would need to adhere to a more functional definition, meaning a definition solely relying on functional concepts,⁵⁸ thereby leaving out all references to technologies. The benefit of technological neutrality based on the rationale of sustainability would be that it makes regulation ‘time-proof’.

⁵⁸ A definition based on functional concepts implies that a definition is drafted in such a way that it describes the use or function of a technology, rather than referring to the technology itself. This way, a definition can ‘incorporate’ the development of new technologies that can be used as substitutes for earlier ones.

A possible drawback of this interpretation could be a decrease of legal certainty; market parties generally tend to be defensive towards wide, functional definitions, as they will argue that such definitions will quickly lead to over-regulation. This position clearly came to the fore in the reactions of several market parties to the 1999 Communications Review. The main fear that was being expressed was that technological neutrality would automatically lead to an extension of regulation to hitherto unregulated markets. Especially telecom incumbents were wary to accept a principle of technological neutrality that would lead to the imposition of regulation to new markets that, in their opinion, were already fully competitive and where regulation would only create disincentives to invest in these markets.

3. Efficiency

A third rationale for technological neutrality flows from the economic analysis that was sketched out above: efficiency. The economic analysis has demonstrated that technology-specific regulation can have a negative effect on static efficiency and dynamic efficiency in particular. In contrast, technology-neutral regulation will have a positive effect on dynamic efficiency, hence on the so strongly desired innovation and investment in the electronic communications sector. This explains why efficiency can be considered as a particularly strong rationale for technological neutrality.

The implications of this interpretation of technological neutrality to any legislative framework are more complex than for the other two interpretations discussed so far. Technological neutrality based on non-discrimination necessitates regulation that does not discriminate between technologies, whereas technological neutrality on the basis of sustainability can be accomplished by the use of functional criteria in regulation. The first interpretation of technological neutrality can relatively simply be fulfilled by adapting existing regulation, i.e. staying at the bottom 'layer' of the regulation chain. At this layer, regulation can be argued to be static. Static regulation should in no way be confused with the earlier referred to 'static efficiency'; it rather indicates that the rule and the application thereof are static in the sense that they do not have the ability to respond to *technological developments* or *changed market conditions*. However, technological neutrality based on sustainability already pushes the lawmaker to move regulation one 'layer' upwards; instead of using *static* rules that refer to specific technologies, it should rather create *dynamic rules* that can evolve with technological developments. The rationale of efficiency pushes even stronger for moving up regulation in this respect; the rationale of efficiency does not only require regulation to be able to cope with technological developments, but also to be able to respond in an efficient way to changing market

structures. Therefore, the efficiency rationale requires the economic analysis that generally *precedes* the (static) rule to become part of the (dynamic) rule. That way regulation can, on the basis of economic criteria, evolve with changing market conditions in order to avoid inefficient regulation.

An example of regulation that echoes this rationale for technological neutrality is the SMP procedure of the 2002 EC Communications Framework.⁵⁹ This procedure heavily rests on economic criteria taken from competition law analysis. The national regulatory authorities (NRAs) assess a pre-defined set of markets to see if any undertakings hold SMP, which is presumed to be equivalent to the absence of effective competition. In order to come to this conclusion, the NRA undertakes a thorough analysis of the economic characteristics of the market. The determination is consequently made with reference to a non-exhaustive list of economic criteria, including amongst others the overall size of the undertaking, the absence of or low countervailing buying power, economies of scale and economies of scope. Having found the presence of an undertaking with SMP, the NRA then proceeds with the imposition of regulatory remedies.⁶⁰ This has as a result that regulation can be maintained, imposed or withdrawn, depending on the competitive state of the market.

4. Consumer certainty

All three rationales discussed so far address technological neutrality from a supply-side perspective; what does technological neutrality entail for market parties and those who regulate them? This emphasis on the supply-side perspective might be the result of the fact that technological neutrality initially was primarily supplier-driven. Nevertheless, this perspective is insufficiently broad to deliver a full and complete picture of the regulatory principle. Technological neutrality can and should also be looked at from a consumer perspective; in fact, if the principle of technological neutrality has the ambition to rank among other principles of good regulation, this perspective will only increase its value. This consumer perspective seems to be considerably underdeveloped in the discussions on technological neutrality.

⁵⁹ See Art. 14-16 of the Framework Directive (see footnote 5); Commission Recommendation on Relevant Markets C(2003)497; Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services 2002/C165/03.

⁶⁰ See Art. 8-13 of the Access Directive (see footnote 5) and Revised ERG Common Position on the approach to appropriate remedies in the ECN's regulatory framework ERG (06) 33.

The fourth possible rationale behind technological neutrality identified here is consumer certainty. Yet again, the sector of electronic communications offers a good setting to further explain the rationale. Convergence has not only caused different technologies to be able to transmit a particular service; in addition, it has also blurred the lines between the various *services* that are being offered. Consumers are used to certain regulation when watching television; as a result of that, consumers could tend to expect the same sort and degree of regulation when they are confronted with a service that is in their eyes similar to the service of broadcasting. This especially holds true for the – positive – regulation that is aimed at protecting consumers and minors. Many parents trust that their children will be protected by the State when they are confronted with (audiovisual) content, irrespective of technology used. From a consumer's perspective, provisions that are aimed at protecting minors from audiovisual information that might impair their physical, mental or moral development should therefore not be dependent upon the technology that gives access to the information.

By extension, one can also argue that a benefit for consumers such as universal service⁶¹ should also be granted irrespective of technology. The idea behind universal service is that the provision of a *defined minimum set of services is available to all, at an affordable price*. However, in the electronic communications sector, this benefit is currently restricted to a connection to the public telephone network at a fixed location, and access to publicly available telephone services where the connection enables voice and data communication services – at narrowband speed – with functional access to the internet. As a consequence of this definition, the concept of universal service heavily rests on *fixed networks* and universal service is thus tied to specific technologies. This is the result of the fact that the current definition has its origin in a time where fixed and mobile telephony were not regarded as substitutes yet, and access to a fixed telephony line was seen as sufficient to fulfil the objective of universal service. Now that times have changed and the mobile telephony market is rapidly growing and merging with the fixed telephony market, it might no longer be justifiable to restrict the concept of universal service to fixed telephony; an implication of technological neutrality on the basis of consumer certainty could therefore be that an obligation to provide mobile communications should be included in the concept of universal service.⁶²

⁶¹ See Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and associated services ('Universal Service Directive')

⁶² Note that this position conflicts with the current position of the Commission on this matter. See the Report written by the Commission regarding the outcome of the Review of the Scope of Universal Service, COM(2006) 163 final. Also, the current definition of universal service in the Universal Service Directive does allow the universal service provider

For the reasons stated above, one can argue that the rationale of consumer certainty is the first rationale that gives a *positive* impulse to technological neutrality; benefits such as protection measures and universal service must be available to consumers, irrespective of the technology used.

Conclusion

The principle of technological neutrality currently does not live up to its full potential. It has been shown that there is strong economic support for the existence of a principle of technological neutrality, and this conclusion is to a certain extent also supported by communications science. Looking at technological neutrality through a legal lens delivers four rationales, each with different implications for regulation. Non-discrimination is a first possible rationale for technological neutrality, and holds that the State should not discriminate on the basis of technology. This rationale brings the least complex implications for regulation. The second rationale identified for technological neutrality is sustainability. On the basis of this rationale technological neutrality seeks to prevent that law and regulation quickly become outdated, and thus require more changes, resulting in an extension of the scope of regulation by changing its form. The third rationale of efficiency directly flows from the economic analysis of technological neutrality. In order to comply with this interpretation of technological neutrality, the State will have to create a dynamic framework that can evolve with changing market conditions. This rationale will therefore not only extend the scope of regulation, but will also let go of the idea that once a firm falls outside regulation, it will always stay in that beneficial position. The last, and least developed, rationale for technological neutrality is consumer certainty. This rationale is the most likely to impose positive obligations on the State by granting regulatory benefits to consumers irrespective of technology. Again, this will most probably lead to an extension of regulation.

Market parties will be most likely to support the rationale of non-discrimination, since this rationale will be the least likely to lead to an extension of regulation. Market parties are defensive towards regulation in general and moreover they will argue that the 2002 Electronic Communications Framework promised to herald de-regulation. One can therefore expect that market parties will try and diminish the meaning of the principle of technological neutrality to an extent that it does not imply more than a technology-specified version of non-discrimination. If the Commission wants to avoid that outcome (which it should if it wants to comply with the

to provide the “connection to the public telephone network at a fixed location” by means of a mobile telephony subscription.

general objectives set out in Article 8 of the Framework Directive), it will have to clarify what it wants to accomplish with technological neutrality, and thus on the basis of what rationale(s) it wants to proceed with the application of technological neutrality. If and when the implications for regulation due to the choice for a specific rationale will clash with the outcome on the basis of another rationale, the Commission will need to make its choice for this rationale transparent,⁶³ and communicate how and why it came to this choice. It might very well be that a hierarchy exists among the different rationales, with due consequences for the outcome of regulation; further research will however be necessary to identify such a hierarchy.

⁶³ The importance of the principle of transparency increases as regulation becomes more flexible. Indeed, a perusal of the Directives comprising the 2002 Framework shows that transparency underlies many of its most central provisions and procedures.