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IPTV missed expectations. Can regulation do the trick?

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1. IPTV and the changing paradigm of television

IPTV is expected to be the natural evolution of traditional television in all industrialized markets facing a diminishing revenue and audience trend. This is proved by the fact that U.S. broadcasters are asking audience to view each show “live” and not recorded (or peer-to-peer) as to ensure live audience to their advertisers and, as a consequence, financing to subsequent episodes of the show. Content broadcasting is facing the challenge posed by the so-called *Martini generation*, which demands content “anytime, anyplace, anywhere”, and is not satisfied by traditional “passive” television since its approach is to use a variety of different media “*à la carte*”.

Modern customers feel that the right of choosing when and where to watch contents (TV serials, shows, news, movies) is an important part of the viewing experience, and this is a formidable quest for the traditional broadcasting distribution mode that imposes a simultaneous one-to-many consumption including additional advertising.

This paradigm-shift presents at the same time a formidable challenge for policymakers who are to completely change the core principles of laws and regulations established over a slow evolution process and in a timeframe of over half a century; the regulatory boundaries of “television”, in a general sense, have, so, rapidly become unclear and are rapidly changing as are the business models and market conditions of television itself.

There are few doubts that IPTV is the natural evolution of television and will therefore replace also its traditional application and form for the most advanced users. There is less certainty as to the chance of IPTV of becoming the dominant replacement technology when it comes to a very basic use of television, as there are several other competing standards, including DVB-T and satellite; all of the “basic” standards may serve the general needs of most television users.

2. In search of an effective business model for European IPTV: the telecom industry's dilemma

The current trends shows that in the next few years Broadband lines in West Europe will exceed the number of phone lines (pots+isdn), enabling a customer base large enough to make television broadcasters and advertisers interested to the business, not just for telecom operators. For example in Italy, the figures for the local incumbent (Telecom Italia, owning nearly 80% of market share), shows that 2007 is the first year in history where the broadband lines equal traditional phone lines, and forecasts that in 2009 broadband lines will outnumber the traditional ones.

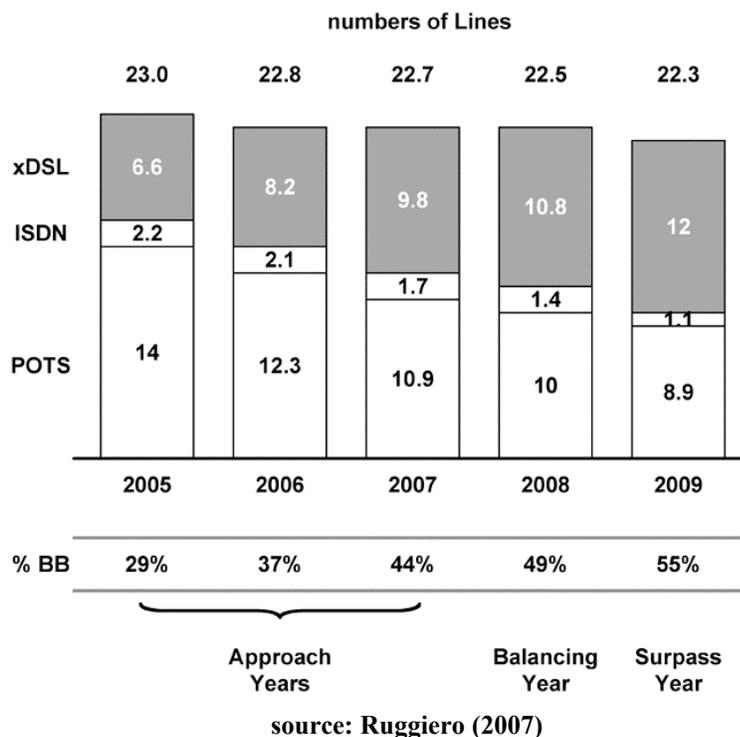


FIG.1 Total access market by technology (mln lines)

When examining the relationship between regulation, market and evolution of television technologies, one must therefore consider that there are many different possible business models of IPTV and there is yet no defined technological standard of IPTV. In fact, IPTV's role in the general television broadcasting system is still to be determined; therefore, regulation may

play a crucial role in ensuring the success of a given IPTV technical and business model over another.

3. The failure of the launch of European IPTV

In the IPTV industry, possible failures in regulatory policy may arise more from a lack of coordination between actors operating along the value chain rather than from a premature adoption of a wrong standard. In fact this industry is clearly in its early stage, where network externalities are not yet activated. Network externalities being absent, risks of negative effects due to path dependence (*e.g.* when a decision, *ex ante* considered to be beneficial, shows *ex post* negative consequences that can hardly be overcome)¹ are negligible. In the future, however, demand-side economies of scale may become significant as the number of subscribers increases up to the point that makes it interesting for the advertisers, therefore showing the multisided nature of its market. Nevertheless, today's IPTV industry seems to be affected by a coordination failure blocking the market growth, since the competing proprietary telecommunication networks are unable to attract customers, disappointed by the existence of multiple incompatible technologies, coped with a poor additional value perceived for the service over traditional television.

The cause is to be searched in the fact that the dominant firm in the closely related market of broadband connectivity, Telecom Italia, has its own proprietary technology, while smaller competing providers would be more in favour of a common standard, mainly for cost saving reasons. However, as shown by Varian (2003), the adoption of a standard is not always an anathema to dominant firms. In some cases, the benefits from standardization can be so compelling that a standard is worth adopting even from a purely profit-maximizing perspective. A simple equation taken from Shapiro and Varian (1999) shows why:

$$\text{your value} = \text{your share} \times \text{total industry value}$$

When total value depends on the size of the market, the incumbent will prefer to increase the market size by adopting a common standard, because the additional value gained thanks to it overcomes the expected market share's reduction.

¹ see Liebowitz and Margolis, 1990; Liebowitz, 2002.

This brings to a situation where all market players fear both a possible strategic use of a unique standard under the control of a competitor, and the risk of cost duplication due to the coexistence of incompatible standards. This situation has some analogies with the "Anticommons tragedy", arising when an excess of property rights enforcement does not give the parties the right incentive to maximize their welfare: people underuse scarce resources because too many owners block each other and no one has an effective privilege of use (Heller and Eisenberg, 1998; (Auteri, 2007)¹. However, if the existing equilibrium is clearly inefficient, to do nothing can hardly be the best strategy. Market players, therefore, have an incentive to start a negotiation, difficult to implement because each player prefers a standard to no standard, but each prefers its own standard to the other's (Varian, 2003). Among other possible equilibria, one in particular is the best in a general welfare perspective: the adoption of a non-proprietary common standard, as we will see later.

It is however reasonable to suppose that the IPTV market is not *tippy* (e.g. a situation in which, because of existing standards, the winner-takes-all-the-market, see Shapiro and Varian, 1999). For a market to evolve toward a unique standard two main characters should be present: large scale economies in production and low need for variety. Conversely, the lower the traditional economies of scale and the higher the need for product differentiation, the higher the probability of coexisting standards within the same market (Shapiro and Varian, 1999). The IPTV market seems to be characterized by a trade-off due to diverging effects. A strong need for differentiation from the demand side pushes toward multiple coexisting standards, because contents in IPTV channels and interactive features from the consumer's perspective, will never be similar among the different packages offered. From the supply side, significant economies of scale in production are likely to arise, therefore creating incentives to all players in the value chain, including right owners which license contents to content aggregators, to adopt one common standard. This problem may be exacerbated by possible abusive behaviour adopted by the dominant firm in the closely related market of broadband transmission, an essential input in the IPTV market. A regulatory decision may, or may not, solve this dilemma, because ex ante interventions are not the only, nor are they necessarily the best solution to complex choices in the adoption of a standard.

In fact, what should be avoided is repeating, in the IPTV market, a regulatory failure which has

¹ By contrast, a resource is prone to overuse in a tragedy of the commons when too many owners each have a privilege to use a given resource and no one has a right to exclude another (Demsetz, 1967; Hardin, 1968).

already delayed in the Italian scenario, possible trends of evolution of analogue, cable and satellite television before the “digital” era.

Italian broadcasting regulations provided that the entity owner of the network broadcasting facilities should bear every editorial responsibility and, therefore, have the power and duty to arrange programming at its discretion.

This regime did not change even after the amendments to Directive TV without frontiers¹ which expressly provided for the possibility that a broadcaster “*has editorial responsibility for the composition of schedules of television programmes [...] transmits them or has them transmitted by third parties*”.

The regulator’s refusal to separate network operators from content providers in the broadcasting market caused a very high entry barrier for third parties wishing to provide content (only those able to own a network and broadcasting frequencies were able to enter) and, as a result, few players may be found on the analogue television market in Italy.

There are obviously no regulations obliging IPTV network operators to provide content, however, because of the different workings of technologies, a failure to regulate may result in an equivalent effect.

The result would be that IPTV, a modern technology, would be born with the vice which affected old analogue television for the past thirty years.

Possible light regulatory tools aimed at unstranding such bad equilibrium with no common standard may include, for example, a tax deduction/shelter for participants to a consortium for IPTV standard setting, or strategic actions by the public TV broadcaster acting as first mover in this game². Alternatively, an incentive may be provided for the network operator to open its content delivery network to third party contents and, at the same time, for content which is aggregated by the telecom operator, to flow on other operators’ delivery networks.

The multisided market theory (Armstrong, 2005; Evans, 2003; Rochet-Tirole, 2005) applied to television (Dukes and Gal-Or, 2003; Peitz and Valletti, 2004; Anderson, 2005) may be useful in this regard. A two-sided market structure is based on a platform enabling interactions with different groups of customers, whose aim is to get each side “on board” by an appropriate charging structure. The economic value of the platform depends on its ability to reduce

¹ Directive 89/552/EEC, modified by Directive 97/36/EC, see <http://europa.eu/scadplus/leg/en/lvb/l24101.htm>

² This strategy has been implemented some years ago by the British Government willing to boost the switch from Analogue to Digital Terrestrial TV in the UK.

transaction costs or information asymmetries between sellers and potential buyers, making it superior with respect to bilateral relations. IPTV is a good candidate for the two-sided market approach, since the two sides are again customers watching TV and advertisers. However, as stated by Rochet and Tirole (2005), *“pretty much any market would be two-sided, since buyers and sellers need to be brought together for markets to exist and gains from trade to be realized.”* For a market to be two-sided, the two sides shall not be able to directly and efficiently bargain the price. If they can, then the market is one-sided. In contrast, if they cannot because of either transaction costs, constraints imposed on the platform or bargaining insensitivity of potential end users, the market is two-sided. IPTV is a pay-TV, where customers pay directly the platform owner and indirectly the advertisers, but the two sides do not negotiate prices.

IPTV has superior interactivity features making it at the eyes of customers a distinct product with respect to other TV platforms (free-to air digital terrestrial, satellite). Interactivity is slightly important for those who watch TV, but it is a much more important feature for advertisers. While the former, thanks to interactivity, can get some additional information by switching to non linear interfaces, the latter dramatically increase quality and quantity and reduce costs of customer profiling. Thus, IPTV has a lot of potentials arising from the two sides of its market. If the problem of finding/choosing a standard will be appropriately addressed, the IPTV market may grow thanks to additional positive externalities arising from customers watching TV but enjoyed by advertisers: a higher audience, makes advertisers happier because their value is increased by both ads and data on customers legitimately gathered by the platform.

4. Can triple play be the European way to IPTV?

The main issue we need to focus to point out the need for a paradigm shift is why the current “triple play” EU business model for IPTV does not seem to meet operators’, broadcasters’ and investors’ expectations.

IPTV, voice and data services have up to now been offered in a triple-play bundle. In fact, European IPTV has been distributed by telecom operators in an attempt to gain dominance on such emerging market. Such aim led to IPTV being configured in walled garden architectures, which do not interchange data and contents and, furthermore, it brings to non-interoperable proprietary technologies whereby each customer is inevitably bound to a single operator. The customer has a very significant switching cost should he/she wish to shift to other provider.

In this business model there is no (or very limited) freedom for the customer to use the same set-top-box for viewing other contents available on the network but not delivered by his/her IPTV provider. There is also a significant barrier or impossibility to export the user profile, the downloaded contents and other personal data to a new and different set-top-box. Content suppliers are therefore negatively affected by the technology foreclosure, that forces them to adapt their output to the telecom operator's technology, with different requirements from each operators, therefore rising their costs.

Along the value chain, a conflict arises between right owners and telecom operators. The former are unwilling to sell their products at startup prices (as requested by telecom operators starting a new service) also because the On-demand option creates a direct competition with the market for premium rental distribution channel.

A telecom operator wishing to upgrade its double play services (voice + high speed Internet) to triple play (that includes TV) will incur in new investments to enable high quality transmission of TV programs on the IP network along with appropriate protection measures and to make the necessary bandwidth available to all users. The anticipated gain from such investments would be to increase average revenue per user (ARPU) and to keep customers from churning to other carriers. It is true, however, that cable TV companies (*e.g.* operators owning a cable infrastructure), do not face a similar cost function, since their main business has always been to broadcast third party contents. For them, implementing Internet and voice over cable broadcasting digital infrastructures does not require significant network improvements (*i.e.* incremental costs to offer triple play service are low).

Interestingly, some telecom operator have recently started marketing stand-alone IPTV services (an offer *e.g.* without voice and Internet), creating a possible new supply mode we may define as “Triple-Play unbundling”¹.

For these reasons, European IPTV seems to have missed the market expectations, after a good start, both of incumbents and new market players. In defining the above described model, operators may have not fully considered three fundamental aspects:

¹ This, however, does not solve the issue of bundling content and telecom services: an editorial product, such as content, should be distributed to the maximum possible number of households, whereas a telecom service delivering a content delivery platform should be priced to content providers in accordance with the number of households reached and, therefore, attempt to acquire the maximum number of contents so that it attracts more and more customers. Both statements contrast with the description of a bundled “content + delivery service” offered only to subscription users which does not allow its contents to be accessed on other content delivery networks and is, itself, a non-standard delivery platform.

First, the IPTV platforms which have been rolled out insofar, are proprietary.

Second, IPTV has failed mainly where a specific regulation has been absent or unclear.

Third, IPTV is currently focused only on telecom operators, playing both the content provider-aggregator-reseller role and the carrier role, therefore forcing traditional broadcasters out of the game, or using them just as a third party content providers with a completely passive role and no real added value in terms of innovation.

The existence of diverse group of owners with divergent agendas is normal in several industries. Sometimes heterogeneity of interests can facilitate mutually agreeable allocations (Fudenberg and Maskin, 1986; Libecap, 1989) but in this setting, as in the biomedical research industry described by Eisenberg and Heller (1998), there are reasons to fear that owners will have conflicting agendas that make it difficult to reach agreement.

The “proprietary” and “bundled” approach which EU telecom operators decided to adopt was very similar to that which allowed US cable operators to easily introduce IPTV in American households, however, the results are very different.

It has, in fact, now been some time since the launch in EU of IPTV services (e.g. Italy’s “Fastweb”, the first European IPTV service). Regardless of the efforts of telecom operators running such services and their considerable investments on contents to be distributed, the users seem not to be so keen on subscribing to these triple play models.

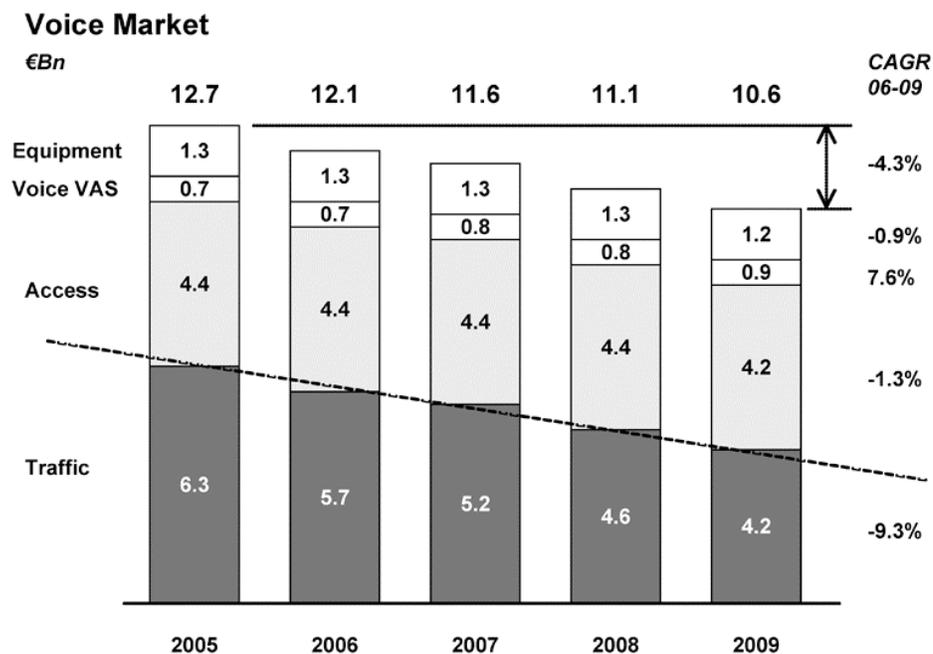
Today IPTV is basically designed as a niche service. In France, where the service has the highest penetration in Europe, only 13% of broadband customers use it. In Italy Fastweb reaches about 170,000 IPTV active users (2Q 2007) with a penetration (18% of the retail customer base) almost stable over past quarters (Fastweb, 2007). Telecom Italia’s Alice Home TV has just started (summer 2007) to promote the IPTV service and estimate in 2009 a 14% penetration on consumer broadband users (Ruggiero, 2007). These numbers are too small for the advertisers and, therefore, operators have trouble recovering investments made in premium contents, in proprietary Content Delivery Networks and in proprietary Set Top Boxes delivered to subscribers. Trends are also discouraging, since IPTV users increase at a lower rate than broadband subscribers.

The reason of the failure of the current model might well be that end users are not perceiving the bundled “triple play” service rendered (voice + high speed internet + digital television) as bringing significant added value to their household connectivity and entertainment system vis-à-vis unbundled offers of the same services by different vendors. It is well known that a bundle of

services does not necessarily improve the value and the quality of each single service bundled. Although supplied with some additional features such as bidirectional connectivity allowing video on demand (VOD), IPTV is still not perceived to be a service with significant added value (with respect to traditional TV) such as to justify higher total costs (higher prices plus additional switching costs) for the user.

5. An alternate way to IPTV

For the vast majority of European countries, IPTV is now being mainly, if not exclusively, supplied by Telecom operators (telcos). Voice traffic revenues, the main row in their financial statements, are reducing over the years, and many users are going to withdraw from having at home the fixed expense of a traditional phone line, replaced by the cellular phone.



source: Ruggiero (2007)

FIG.2 Total Voice Market in Italy (Bn Euro)

Operators are in search of an alternate income source to withstand the diminishing revenue of the last fiscal years. So for now, IPTV is used as a way to intercept some additional revenues in contents reselling market, and at the same time as a way to attract new broadband customers and to diminish the churn. This prevents IPTV from being offered to television broadcasters as a platform to develop and deliver the television of the future.

Nevertheless, a telecom operator's core business remains that of providing broadband connectivity and voice services. In this respect, "triple play" IPTV is only a way to bear the addition high fixed entry costs of content libraries' acquisition coped with the inevitable increasing incremental costs to work out the chosen business model.

With that in mind, the policymaker's role in supporting a new IPTV business model without hampering competition is that of encouraging operators to rediscover their core business and let content providers enter the IPTV arena. In fact, as mentioned above, what allowed the above described failure of European IPTV, is a regulatory inadequacy which is not new to broadcasting regulation: the network operator is entitled to editorial decisions on content to be broadcast since content provider and network operator are one and only.

Until a telecom operator acts as content delivery network and selects which channels and libraries may or may not be broadcast, most third parties will not have access and the ones who do will not be competitive since they will provide their content in a protected environment and to a limited number of viewers.

The first IPTV services were structured as above described because the operators' view was that streaming linear channels and delivering audiovisual content through a broadband connection was a value added service, provided as an extension of the broadband connection service itself and there was no need to involve traditional broadcasters in designing the service.

Accordingly, the service was designed to meet the requirements of electronic communications regulation, on the assumption that television regulation requirements would apply only to content providers, already active on other platforms but did not directly affect the delivery network, platform and technology.

Telecom operators started acting as IPTV broadcasters in a *de facto* unregulated environment: the fact that there was no regulatory obligation to adapt IPTV broadcast channels to the specificity of the new delivery platform (e.g. no service to be ensured to IPTV users, no interoperability obligation, no format for advertising, etc.) caused a general lack of innovation and determined content providers to use IPTV as a simulcasting platform with few exceptions, such as providers offering centralized videorecording and time-shifting services.

The choice of orienting the technology towards an unregulated telecom model caused two additional major difficulties to IPTV emerging as a largely adopted platform: (i) broadcasters not to look at IPTV with particular favour: it was seen as a mere opportunity to simulcast a

channel but, at the same time, providing new and appealing content on such unregulated media, was regarded as a potential threat to traditional platforms; (ii) telecom operators' to face the challenge of building content libraries without any clear regulation and with hostility from the right owners, who do not favour releasing content on unregulated platforms.

In so doing, IPTV does not have perceivable advantages to users, with respect to satellite and other kinds of premium television, whereas the obligation to pay for the bundle of communication services as a condition to subscribe is inevitably perceived as an additional burden on the user.

For example, customers of German terrestrial broadcaster RTL are unwilling to pay for video-on-demand content available at their convenience. RTL revealed that a challenge that RTL Online is facing with its video-on-demand service that it doesn't face in the terrestrial sector, is how to generate advertising revenues, because they can serve 10 minutes of advertising in an hour of normal TV but people are not willing to do that on a VoD service. They also stated that on-demand content that is normally broadcast for free will also be offered for free, while paid on-demand content will cost the same as existing premium content. Coming from the content, rather than the network provider side of the industry, RTL's push into next generation TV services has seen it launch more complimentary services, including interactive digital TV, and a YouTube clone in order to spread the reach of its programs (Wood, 2007).

But the production of next-generation TV contents and services, those who attract the main audience in the future, requires a pervasive and common standard along the IPTV technology chain. Terrestrial broadcaster needs to address the biggest possible audience, they can't care about the small niches constituted by the various IPTV gardens, and they can't produce innovation if the required technical functionalities are not uniform among platforms. In particular those broadcaster providing an universal service, can't choose to publish their contents through a proprietary platform. The regulatory vacations on these topics slow down the entire IPTV sector. This is to say that, the delivery method changed but not the core of the service failing to meet IPTV's expectation of introducing a new "television content" paradigm.

Adopting a non-proprietary open common standard will very likely stimulate innovation in contents and content-related services paradigm. Thanks to an open common standard (the IP suite), Internet acknowledged a tremendous growth and continuous innovations. This is particularly true for the Web, where exclusive technical controls rapidly become a bottleneck. The standardization of design enables the industrial echosystem, as it was for the so-called

“American system of manufacture”, because a set of technologies that offers a rich set of components that can be combined and recombined enable the creation of new and innovative products. The innovation comes not in the basic building blocks but rather the ways in which they are recombined (Shapiro and Varian, 1998; Varian, 2003). If standard is non proprietary, innovations are faster because encourages those ideas that would have been, instead, blocked by systems controlled by a corporation who protect its own vision of the market (Lessig, 2002), or when innovators are stopped by multiple and overlapping patent protections or a multiple controlled environment (Buchanan and Yoon, 2000).

6. A regulatory approach toward IPTV open standards

An inefficient approach to the European IPTV market failed to conquer European customers' favour to IPTV technology. Such approach was induced by a lack of specific sector regulation. In light of the above, regulation may have an important part in supporting a sustainable IPTV business model without hampering market development.

Our view is that a steer towards the new paradigm will be coming from the New Audiovisual Without Frontiers Directive Proposal¹ which could support a different kind of IPTV market should the policymaker pursue a coherent and "light touch" strategy in implementing the Directive.

The new Audiovisual without Frontiers Directive proposal, due for final approval in December 2007, clarifies a very debated topic: the Directive extends the scope of the mere conduit principle²; only entities bearing editorial responsibility may be held liable, whereas entities providing only transport for the broadcast stream (linear and non linear) are not to be considered liable for editorial content.

The new principle could induce telecom operators to embrace the opportunity to shift back to their original core business, renouncing hybrid business models in favour of an outsourcing schema where third party "independent" content providers assemble linear channels and on-demand libraries to be broadcast on an IPTV platform managed by a telecom operator.

On the other hand, the more courageous operators which have heavily invested on contents will become “media companies” and have to behave like broadcasters vis-à-vis their programming.

¹ see http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=2343.

² see Section 15, E-commerce Directive, 2000/31/EC: the principle of mere conduit exempts from liability the service provider, ISP or network operator which complies with Regulation and acts as mere conduit, caches the material or hosts the material.

This might induce them to consider opening their contents to third-party delivery platforms to repay investments and reduce the risk.

A standard will then be inevitable.

In this scenario, broadcasters may enter "heads-up" in the IPTV market, in force of their know-how as producers of television programming and, therefore, content providers.

Telecom operators, may so better concentrate on the QoS (Quality of Service) aspect and on the interactive part, which is demanded to interactive service providers, not regarded as carriers of editorial liability if their activity is separate from the content provider.

Such alternative approach to the IPTV issue, is based on a combination of service competition, open standards and a flexible regulatory model structured to give market players enough certainty to promote investments. It is already functioning in France, the country which most invested in IPTV and interoperability regulation, regarded as a possible European "success case" (Rand Europe, 2006). In fact, in the suggested approach, regulation plays an important part, provided it is not used to impose limits and foreclose possibilities, but, rather, to disclose opportunities to operators, thus establishing a more enhanced "level playing field". One where broadcasters and telcos are able to compete on one converging interoperable IPTV market with very low entry barriers.

7. Concluding remarks

The content market is normally structured in such a way so that no player possesses the rights on all the contents and channels a user may wish to view.

Triple play's solution to this issue was to force the telco operator to enter in costly agreements with content providers, which enabled the telco's proprietary IPTV platform to carry more contents/channels on its proprietary platform along with its own self-acquired contents/channels. Such a solution is less efficient than the traditional television broadcasting market. In fact to enter the market every player needs to buy rights only for the contents attracting viewers on its platform. Channels interoperate in traditional television terminals so that viewers do not need one set top box per group of channels.

This logic must be transported to the IPTV world and this can be done through light regulation establishing the appropriate principles.

Given the considerable investments which need to be borne to deploy a proprietary IPTV

network, one could therefore say regulation plays an essential role.

This is because, quickly defining rules which enable players to interoperate with each other in the IPTV market, could stimulate an adjustment of their strategies with regard to proprietary network investments: the same or, presumably, better results in terms of content delivery could be reached with a cooperative strategy.

In this case, interoperability may not be the result of market dynamics. There could be a delay in reaching the necessary agreement on the need to interoperate which could cause some players to enter a non-return path of proprietary investment.

Furthermore, a common set of specifics must be defined and someone must, therefore, be entrusted with authority to do so or, else, be chosen as common platform between similar proposals. This could be the ideal task for technical regulation to come once the principles are established by the main regulatory bodies.

It is to be noted that the new Audiovisual Without Frontiers Directive Proposal, already addresses some of the aforementioned issues, so bringing IPTV closer to television than to electronic network communications.

This is why competition on IPTV should change between a competition to supply technological platforms that includes manufacturers either of chipset, set-top-box (STB) and middleware to a competition based on providing users with the best content on a common interoperable platform (i.e. technology allowing distribution of a linear channel or on-demand content).

This would also enable the development of a robust ecosystem in the value chain, increasing the economy correlated to the IPTV market.

At present time, complete *vertical integration* is the only model implemented by the telcos running IPTV services. Both the business model and the technology are built exclusively around the telco's competition needs, relegating the television industry in the backyard. This model crushes the audience and reduces the number of players in the value chain (electronics manufacturers, software developers, content and format authors and producers, interactive services developers and providers, etc.) able to compete in the market arena. In particular, all the innovation in content production and distribution who pass through interactivity between the content and the audience, cannot be developed without a common standard along the IPTV value chain. The reason is that adapting the interactive services for too many proprietary IPTV platforms, would raise production costs too much, eventually, definitively discouraging the system development (or keeping it at a low level of functionalities), therefore not stimulating the

customers interest in IPTV over traditional TV.

The birth and raise of a common technological standard would enable and promote the *horizontal integration* model. In this model every player focuses mainly in its own core business, building new value on it instead of stealing value from the adjacent layers.

This would stimulate innovation in every layer, attracting investment because of the bigger audience that the adoption of a common standard allows.

Competing on quality to stand in front of their own competitors, but cooperating on a common technology standard because *horizontal integration* carries mutual advantages between value chain players, and allow every player to be protagonist on its own layers.

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